National Estuary Program

Toxics and Nutrients

Federal Fiscal Year 2014 & 2015 Work Plan

--Second Draft--

May 29, 2014

Photo: Oakland Bay, Puget Sound. Photo taken from the shoreline of a 47-acre land purchase (former Bayshore golf course) partially funded by a NEP toxics and nutrients competitive sub-grant.

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Section A. Summary Information

Background Information for the Toxics and Nutrient Strategy

The Environmental Protection Agency (EPA) awarded the National Estuary Program (NEP) Lead Organization Cooperative Agreement (PC-00J201) for Toxics and Nutrients Prevention, Reduction, and Control to the Washington Department of Ecology (Ecology) in February 2011. This was one of seven NEP Lead Organization Assistance Agreements that the EPA awarded to Management Conference partners to support Puget Sound recovery. An 'Overview of the Puget Sound National Estuary Program Management Conference and Funding Agreements under CWA Section 320' is provided in Appendix 5 and introduces the general role and relationship of these Lead Organizations. Cooperative Agreement (PC-00J201) received four increments of funding totaling $15,584,834.

This context is important as this cooperative agreement work plan, although containing separate and distinct projects from the previous work plan, executes the final two years of funding under the Toxics and Nutrients Strategy six-year strategy approved under Cooperative Agreement PC-00J201 (Appendix 3). The planning targets for Federal Fiscal Year 2014 and 2015 (also called rounds 5 and 6 of the six year strategy) allotments are $2.5 million per year, for a total of $5 million.

The toxics and nutrients agreement is unique among Puget Sound LO agreements since it implements a strategy for both toxics and nutrients prevention, reduction, and control. This strategy separates toxics and nutrients into "implementation" and "science" categories resulting in four interconnected but distinct work plan strategies (Appendix 3).

Goal of this Cooperative Agreement

The goal of the NEP toxics and Nutrients Cooperative Agreement is to improve both human and environmental health in the Puget Sound ecosystem by preventing, reducing and controlling toxics and nutrients from entering Puget Sound fresh and marine waters.

It is important to note that the Toxics and Nutrients Six year strategy and the projects in this work plan fit under broader toxics and nutrients strategies for Puget Sound, the state, and the larger region. There are several ongoing programs and activities in the Puget Sound Region to address toxics and nutrients and the NEP toxics and Nutrients Cooperative Agreement, guided by the six-year strategy, was designed to effectively and strategically allocate Puget Sound NEP toxics and nutrients money to fill key data and programmatic gaps in these ongoing activities.

Overall Strategy of this Cooperative Agreement

The major categories of work continue as reflected in the six-year strategy approved under PC-00J201 (Appendix 3). Themes and projects in rounds 5&6 for both toxics and nutrients were selected by analyzing the following documents/priorities:

- Priorities of 2012 Action Agenda (strategic initiatives and ranked sub-strategies)
- NEP Six-Year Strategy and Work Plan
- Biennial Science Work Plan (BSWP)
- 2014 LIO Proposed Near-term Actions and Priorities
- Substantial Environmental Results
- Interim Targets
- EPA Strategic Measures
- Treaty-Protect Resources
- Budget, General Logistics, Readiness to Start
- Leadership Conference Comments
- Critical gap funding and PSEMP Gap-Filling Recommendations

In addition, after three years of implementing the six-year strategy we know which categories of work can be implemented efficiently and effectively, with high return on investment towards satisfying high ranking sub-strategies and NTAs. This approach is also a key element of our strategy for reducing unliquidated obligations (ULOs), since these projects tend to spend at a reliable rate (Section F).

Below is a summary of specific strategies, including additional prioritization criteria, for the toxics implementation, toxics science, nutrients implementation, and nutrients science funding to be allocated under this agreement, including major categories of work and Action Agenda alignment. **For the complete toxics and nutrients six-year strategy, see Appendix 3.**

Section B. Toxics Implementation

Toxics Implementation Strategy Summary

Toxics Funding Priority #1: Strategic Initiatives

The following item is the highest priority for Rounds 5&6 funding because it is a Near-Term Action (NTA) strongly associated with a 2012/2013 Action Agenda strategic initiative (urban stormwater):

NTA #	Title and Description
C2.4 NTA 1	Compliance Assurance Program. Ecology and local governments will increase inspection, technical assistance, and enforcement programs for high-priority businesses and at construction sites.

Toxics Funding Priority #2: Sub-strategies Ranked Based on Ecological Criteria and Local Priorities

PSP ranked all of the sub-strategies in the Action Agenda. The second-ranked sub-strategy is C1.1[1]: "Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment." The seventh-ranked sub-strategy is C2.4: "Control sources of pollutants." Both of these sub-strategies clearly address toxics issues. See the Action Agenda for full texts of both sub-strategies.

Additional Factors

While the Action Agenda was the dominant source for determining priorities, Ecology also considered the Puget Sound Toxics Assessment (see below), the toxics roadmap, and the toxics reduction strategy. More information on other sources of priorities, a conceptual model, targets, pressures, existing programs, chemicals of concern, water quality standards, and gaps are in Appendixes 3 and 4.

The key recommendations from the Puget Sound Toxics Assessment (http://www.ecy.wa.gov/puget_sound/toxicchemicals/index.html) are:

- Copper. Find ways to reduce the amount of copper that gets washed into our streams and rivers.
- Roofs. Rethink our roofs since roofing materials appear to be a significant source of copper, cadmium, zinc, and phthalates.
- Creosote-treated wood. Increase efforts to remove creosote-treated wood – a significant source of PAH – from Puget Sound.

[1] The highest-ranked sub-strategy is related to stormwater: C2.2 ("prevent problems from new development at the site and subdivision scale"). While this sub-strategy touches on toxics and nutrients, it is clearly aimed at the NEP watershed grant.

- Petroleum. Keep working on developing strategies to reduce petroleum releases – particularly chronic spills, drips, and leaks from our cars and trucks as well as our recreational boats and small commercial vessels.

In its toxic roadmap Ecology identified prevention as the smartest, cheapest, and healthiest approach to reducing toxics threats. The focus of prevention efforts is in products and stormwater. Six identified steps are:

1. Identify chemicals of concern.
2. Gather and manage data on chemicals of concern.
3. Phase out persistent, bioaccumulative toxins (PBTs).
4. Spur use of safer alternatives.
5. Promote green chemistry and design.
6. Improve prevention tools and authorities.

Indicator Targets for Toxics

Specific Puget Sound Partnership ecosystem recovery targets related to preventing the introduction or release of contaminants to the water, air, and lands of the Puget Sound basin include ensuring that by 2020:

- The levels of specific toxic chemicals, including PCBs, PDBEs, and polycyclic aromatic hydrocarbons (PAHs), and other endocrine-disrupting compounds, are below threshold levels in fish tested in Puget Sound.
- Marine sediments in Puget Sound bays and regions show minimal impacts from toxic chemicals in marine sediment quality indicators.
- The number of impaired freshwater bodies decreases.

More information about these targets is available at:
http://www.psp.wa.gov/vitalsigns/index.php.

Main Pressures Affecting Toxics

The PSP has identified pressures that may affect toxics. As described in the conceptual model, the main pressures affecting toxics loading are:

- Activities related to agriculture and livestock grazing.
- Transportation-related sources including toxics released from automobile use.
- Releases to air including wood smoke, automobile exhaust, and other sources of air pollution that either directly in indirectly reaches Puget Sound.
- Stormwater conveyance of pollution from land to waterbodies. The Puget Sound Toxics Loading Assessment found that stormwater "contributed the largest loads to Puget

Sound, typically accounting for more than one-half of the total loads from all pathways combined" (page 14).

- Municipal Wastewater Treatment Plants discharge toxics from households and industries. According to the Puget Sound Toxics Loading Assessment, WWTPs "generally accounted for less than one-tenth of the delivery to Puget Sound for each of the [toxics] assessed", although there were exceptions (page 14).
- On-site septic systems also discharge toxics from households and some businesses.
- Industrial discharges treat and then discharge wastewater. Some industries discharge to a WWTP while others discharge directly to waterbody.
- Oil spills are a direct source of oil and petroleum products to Puget Sound and other waterbodies.
- Already polluted sediment and soil is a source of toxics downstream.

Other pressures identified by PSP that do not affect toxics loadings to the same degree include: timber production; shoreline infrastructure; recreational activities; fin and shellfish aquaculture; exotic and nuisance species; dredging and dredged material; and military exercises.

Existing Programs Controlling Toxics

There are numerous existing programs and programs that are just starting to control toxics. Programs highlighted in the action agenda include:

Prevention

- Implementation of the state law limiting copper (and other toxic chemicals) in vehicle brake friction material
- Reviewing the PBT list and prioritizing the next PBTs for chemical action plans
- Developing and implementing a green chemistry road map
- Developing guidance to conduct chemical alternative assessments
- Completing an assessment of alternatives to commercial uses of phthalates
- Completing development of a state implementation plan for particulate air pollution in the Tacoma/Pierce County non-attainment area

Limit or Manage

- Management of the residue from auto shredding
- Local source control programs
- Stewardship programs, including those managed by the Puget Sound Partnership, stormwater permittees, and NGOs
- Hazardous waste compliance activities: inspections and responding to complaints.

Clean-up

- State and federal site cleanup activities: site identification, investigation, clean up, and monitoring

Chemicals of Concern

The Toxics and Nutrients NEP grant will focus most of its work on a short list of chemicals of concern. While there are numerous toxic chemicals that need to be addressed, focusing on a selected list of top-priority chemicals allows a more strategic, targeting approach. The chemicals of concern were chosen based on Action Agenda targets and the findings of the Puget Sound Toxics Assessment. Other chemicals can also be addressed on a case-by-case basis when there are unique opportunities to make a significant impact.

Parameter	*Reason for Selection*
PAHs	Identified in the Puget Sound Toxics Assessment; Toxics in Fish threshold for liver disease and PAH metabolites in bile of English sole.
Phthalates	Identified in the Puget Sound Toxics Assessment; Toxics in Fish threshold for reproductive impairment in English sole
Copper	Identified in the Puget Sound Toxics Assessment. Reports indicating impairment on juvenile salmonids.
Petroleum	Identified in the Puget Sound Toxics Assessment; source of PAH release
PCBs	Target in the Action Agenda; Toxics in Fish thresholds for human health and fish health risks from contaminants in the pelagic food web
PBDEs	Identified in the Puget Sound Toxics Assessment

How do emerging contaminants fit in?

Emerging contaminants can often be overlooked when focusing on specific chemicals of concern. Emerging contaminants for this strategy include endocrine disrupting compounds (EDCs) and pharmaceuticals and personnel care products (PPCPs). The chemicals of concern tend to be the chemicals that have been used extensively and have been the subject of many scientific investigations. The Toxics and Nutrients NEP Grant has and will be used to conduct focused studies on emerging contaminants. The purpose of this work is to identify problematic chemicals as soon as possible and address these problems before they become a widespread chemical of concern.

Focus on Prevention

Prevention is the primary focus for toxics in the NEP Grant. Ecology identified prevention as the smartest, cheapest, and healthiest approach to reducing toxics threats. Since prevention efforts tend to focus on long-term solutions, we also recognize the need for shorter-term management of current releases to the environment. Managing/controlling toxics is the secondary focus. Part of the NEP grant will also address scientific investigations and adaptive management and detailed in a later section of this strategy. This strategy will not focus on cleaning up substances that have polluted air, land, and water. While this is clearly important, Ecology and EPA have clean-up programs to address these problems. NEP funds could be targeted for specific projects such as source control at these sites, but in general NEP funds will not be directed to clean up.

Geographic Focus

In most cases, prevention efforts are Sound-wide. However, some projects have a geographic focus. While many factors are involved in selecting a geographic focus for a given project, the Toxics NEP grant will focus on those areas with the most significant problems. These areas tend to be the areas with the greatest human impact such as urban bays. In some cases, such as pesticide use, it may be areas dominated by one particular land use.

Water Quality Standards

Both the marine water of Puget Sound and the fresh water tributaries have water quality standards for some, but not all, toxics. Where these standards exist, they provide a numeric target for prevention and management activities. Ecology uses Total Maximum Daily Loads (TMDLs) to determine how to meet standards. While there have only been a few TMDLs for toxics in Puget Sound to date, we expect more toxics TMDLs in the future. Future NEP funds will likely be able to help fund activities identified in a TMDL.

Gaps

Missing Programs/Activities to Control Toxics

One frequently-identified gap is that water quality regulatory programs only address a short list of specific toxics. Few implementation programs have sufficient funding to fully address every issue, but every identified pressure and strategy has at least some ongoing work to address it. Historically, more funding focuses on cleanup and control than prevention. While they have received more funding, much more is needed to address contaminated sites, stormwater treatment, and other cleanup and control programs. While prevention programs, such as green

chemistry, can be a less-expensive way to address toxics, they are relatively new and have also been underfunded.

Criteria to Evaluate and Make Decisions on Programs and Activities

Funding decisions are based on the priorities identified in this document. Within a given priority, specific project details are determined based on project outputs and outcomes, feasibility, and cost. Feasibility includes issues such as schedule, previous experiences, likelihood of success, local and regional support, and ability to leverage other projects. These criteria are formally evaluated during a competitive process. The application specifically lists the criteria used for scoring individual proposals. The criteria are informally evaluated for direct awards where there is only one identified project and one lead entity.

Major categories of work and linkages to the Action Agenda

All of these factors coupled with the overall strategy criteria (page 4) and anticipated budget target resulted in the following continued areas of focus:

1) **Local Source Control**
2) **Landscaper Accreditation Project**
3) **Woodstove Replacement**
4) **Puget Sound Clean Cars**

Toxics C2.4 NTA 1: Compliance Assurance: Local Source Control

Project Title	Local Source Control Partnership (LSC)
New or Ongoing?	Ongoing
Round(s)	5&6
Project Objective	Provide funding to local source control programs (originally awarded through an RFP) to conduct small business site visits to reduce polluted stormwater and toxic threats to Puget Sound.
Project Description	Local Source Control (LSC) is "boots on the ground" small business assistance delivered by local jurisdictions to find and fix problems related to improperly stored products/toxic wastes, improper waste disposal, spills of toxic chemicals, and improperly maintained storm drains. LSC relies on trained staff for its effectiveness.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C1.1 (rank 2):** Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment. **C2.4 (ranked 7):** Control sources of pollutants. **Near-Term Actions:** **C1.4.3** Conduct Local Source Control Business Assistance Visits. **C1.6.1** Hazardous Waste, Wastewater, and Air Quality Compliance and Enforcement. **C2.4.1** Compliance Assurance Program.
LIO Priorities or NTAs	**STRT NTA 5f:** Update, adopt, and implement the Clallam County Stormwater Management Plan [plan includes surface water loading and runoff from built environment]. **STRT 5h:** Clallam County Stormwater Technical Assistance **STRT 5i:** Clallam County Stormwater Outreach and Education **South Central LIO NTA 11:** Keep toxics and excess nutrients out of waste stream
Potential Partners (and Roles)	Current NEP partners: City of Bothell, City of Port Angeles, City of Puyallup, Snohomish Health District, and City of Kirkland.

Sustaining Funding	**Yes/likely-** State budget package is being submitted to continue funding for these local positions after round 5&6 of the toxics and nutrients grant.
Estimated Milestones	Conduct at least conduct 1,625 small business site visits by June 30, 2017 (will be broken out with an annual goal to meet stretch goal condition). Jurisdictions will also distribute spill kits and conduct a secondary containment voucher pilot program. Local source control specialists will attend required quarterly training workshops. LSC jurisdictions will meet conditions of the interagency performance-based agreement.
Estimated Budget	**$530,000 Round 5 / $530,000 Round 6** FY15-17 Proposed Contracted Amounts: City of Bothell $150,000; City of Port Angeles $158,000; City of Puyallup $138,000; Snohomish Health District $593,000; City of Kirkland $98,000; remaining budget: up to $50,000 for spill Kits and $75,000 for Secondary Containment
Outputs / Deliverables	• Number of site visits conducted by June 30, 2017. • Number of different business sectors visited. • Number of issues by media identified during the initial visits. • Number of unresolved issues. • Number of spill plans prepared and kits distributed. • Number of secondary containment equipment installed.
Short-term Deliverables	• Provide toxics reduction and prevent technical assistance to small business in Bothell, Port Angeles, Puyallup, Snohomish County, and Kirkland.
Intermediate Outcomes	• Number of environmental issues resolved • Number of referrals to Ecology addressed. • Number of improved changes in business practices.
Long-Term Outcomes	• Environmental monitoring data indicates improvements. • Improved watershed water quality.
CWA Programs	4 and 6

Toxics C1.4 NTA 1 Landscaper Accreditation

Project Title	Sustainable Landscape Professional Certification Program ("ecoPRO")
New or Ongoing?	Ongoing
Round(s)	5
Project Objective	To ensure a successful launch and transition of the program to the selected administrative organization by providing funding support for initial program implementation. In short, with investment in the program it should become financially self-sustaining.
Project Description	Funding will support the initial implementation of the program. Funding will support the hiring of a director (~.25 FTE for 2 yrs.), implementation of the marketing strategy developed in phase one, and to solidify administrative and governance structures (build relationships with education partners and form permanent steering committee). The purpose of the currently NEP-funded project has been to develop a sustainable landscape professional certification program. Objectives have been to identify an organization to run and maintain the program; develop a business plan (including an administrative/governance plan, marketing plan, and funding strategy); and assess and plan for the market demand of "green" landscaping services. Increased use of sustainable landscape practices will reduce water use; reduce the use of pesticides; reduce run-off; create habitat; improve soil, water and air quality, and reduce occupational risk for landscape professionals, amongst other things.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C1.1 (rank 2):** Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment. **C2.4 (ranked 7):** Control sources of pollutants. **C1.4 (ranked 12):** Provide education and technical assistance to prevent and reduce releases of pollution. **C1.2 (ranked 13):** Promote the development and use of safer alternatives to toxic chemicals. **Near-Term Actions:** **C1.4.1** Landscaper Accreditation **Biennial Science Work Plan:**

	C1: Describe the availability, feasibility, and safety of alternatives to products and processes that use and release toxic chemicals of concern into the Puget Sound ecosystem.
LIO Priorities or NTAs	**STRT 5h:** Clallam County Stormwater Technical Assistance **STRT 5i:** Clallam County Stormwater Outreach and Education **Hood Canal:** HCCC Stormwater Retrofit Plan. **South Central LIO NTA 11:** Keep toxics and excess nutrients out of waste stream
Potential Partners (and Roles)	Strong partnerships contributed to the success of phase one of this project – development of the program. Many will likely continue to be involved in the program, including: • State agencies (WSDA, ECY, PSP) • Washington State Nursery & Landscape Association (WSNLA) & Washington Association of Landscape Professionals (WALP) – administrative organization • Local health departments • Parks and zoos • Colleges and universities • Non-profits • Landscape professionals There is tremendous opportunity for further collaboration with a host of organizations: • Local jurisdictions, including LIOs, with an interest in minimizing waste, protecting water bodies, maintaining soil quality; • Federal or state agencies committed to supporting local environmental and sustainability initiatives; • Private utilities, water districts, and conservation districts pursuing resource conservation • Professional associations committed to enhancing the landscape industry and supporting members through networking, training, and recognition opportunities.
Sustaining Funding	**Yes-** sustaining the program after NEP is the primary purpose for this funding investment.
Milestones	• Marketing: develop website; produce and distribute marketing materials • Hire Executive Director

	• Conduct 2 trainings per year (2015 & 2016) • Formalize steering committee • Seek and obtain additional funding • Formalize agreements with education partners
Budget	This will be a direct award to the administrative organization (WSNLA/WALP Educational Foundation). The proposed budget is $160,000: • $75,000 - marketing • $35,000 - administration • $50,000 – executive director
Outputs / Deliverables	• 4 training opportunities for landscape professionals to receive training in sustainable land care and become certified (potentially 100 new certifications) • Executive director hired
Short-term Deliverables	Increased awareness of and demand for sustainable land care practices by consumers.
Intermediate Outcomes	Program becomes financially sustainable.
Long-Term Outcomes	Reduced use of pesticides by landscape professionals (thereby reducing toxics loading via stormwater to Puget Sound). Better management of fertilizers to reduce runoff of nutrients into surface waters.
CWA Programs	4 and 6

Toxics C1.1 NTA 1 PAH and PFOs Chemical Action Plans

Project Title	Puget Sound Clean Air Authority (PSCAA) Woodstove Removal Program
New or Ongoing?	Ongoing
Round(s)	5&6

Project Objective	To reduce the highest major source of PAH and fine particle pollution in the Puget Sound Region in order to continue implementation of the PAH Chemical Action Plan (CAP).
Project Description	The Puget Sound Clean Air Agency (PSCAA) is conducting this work to reduce PAH emissions and inputs to the Puget Sound. PSCAA will extend and complement the existing Wood Smoke Reduction Program (WSRP) in Pierce County. PSCAA will continue and expand the "on the ground" wood stove replacement program. Under the grant, PSCAA will 1) increase the capital funds available for incentives and 2) to recruit and enroll households in the expanded WSRP. An additional $200,000 investment in incentive (capital) funds would directly fund an additional 172 devices to be removed or replaced. The total PAH emission reductions from this supplemental work would be about 65 lbs. per year, which is about 1 ton over a 30-year period.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C1.1 (rank 2):** Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment. **C1.3 (rank 9):** Adopt and implement plans and control strategies to reduce pollutant releases into Puget Sound from air emissions. **C2.4 (ranked 7):** Control sources of pollutants. **C1.2 (ranked 13):** Promote the development and use of safer alternatives to toxic chemicals. **Near-Term Actions:** **C1.1.1** PAH and PFOS Chemical Action Plans.
LIO Priorities or NTAs	**South Central LIO NTA 11:** Keep toxics and excess nutrients out of waste stream [Tacoma is close enough to King County that PAH drift in the Puget Sound certainly occurs]
Potential Partners (and Roles)	• Local utilities to help identify potential customers (Tacoma Power, PSE) • Tacoma-Pierce County Health Dept. and Tacoma Neighborhood Councils for outreach about the program • Local government programs that offer weatherization energy assistance programs to promote the program • Heating retailers/contractors/installers to conduct the woodstove replacements

Sustaining Funding	**No-** program will likely continue after NEP funds at reduced rate. However, program existed before NEP investment; we just enhanced the program to specifically implement PAH CAP (NTA C1.1.1).
Estimated Milestones	An additional 172 is projected
Estimated Budget	**$100,000 Round 5 / $100,000 Round 6** All funds would be passed thru to original RFP winner, Puget Sound Clean Air Authority
Outputs / Deliverables	• Number of wood stoves replaced • Number of fireplace retrofits
Short-term Deliverables	• PAHs reduced 65 lbs. per year in the project area, keeping them out of Puget Sound
Intermediate Outcomes	• Reduced wood smoke emissions and increased consumer awareness of the health risks associated with wood smoke.
Long-Term Outcomes	• PAHs reduced 1 ton over a 30-year period, keeping them out of Puget Sound
CWA Programs	4 and 6

C2.4 NTA 2 Vehicle Leak Detection Program: PS Clean Cars

Project Title	Puget Sound Clean Cars: Innovative Solutions for Vehicle Leak Prevention & Detection
New or Ongoing?	Ongoing
Round(s)	5&6
Project Objective	Work with the Vehicle Leak Detection Program (VLDP) to convene an innovative solutions working group with the automotive industry to eliminate or reduce toxics loadings from vehicle leaks to Puget Sound.
Project Description	This project will bring together experts and leaders from the automotive sector to identify innovative technology solutions to reduce vehicle leaks. The project will establish an industry partnership to identify the primary sources of engine leaks to verify the problem. The project will identify technology solutions, including improved engine design, advanced gasket sealing materials, leak detection systems, and other innovative solutions in partnership with the automotive industry.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C2.4 (ranked 7):** Control sources of pollutants. **C1.2 (ranked 13):** Promote the development and use of safer alternatives to toxic chemicals. **Near-Term Actions:** **C2.4 NTA 2** Vehicle Leak Detection Program (this project was the primary recommendation from the steering committee of that initial effort) **Biennial Science Work Plan (BSWP)**: **C1.** Describing the availability, feasibility, and safety of alternatives to products and processes that use and release toxic chemicals of concern in the Puget Sound ecosystem is a scientific priority.
LIO Priorities or NTAs	**South Central LIO NTA 11:** Keep toxics and excess nutrients out of waste stream
Potential Partners (and Roles)	The project will work with the existing project team to implement suggested innovative solutions recommendation: • Society of Automotive Engineers- Appropriate vehicle standards committee to engage with automotive designers and engineers • EPA HQ and regions to coordinate with other auto related projects • The "Ecology Center" of Michigan

	• LIOs and local NGOs – experienced nongovernmental organization working to reduce impacts from automobiles. • Local governments – Stormwater programs interested in reducing vehicle drips and leaks.
Sustaining Funding	**No-** steering committee will likely exist after NEP funds expire, but this is a one-time project.
Estimated Milestones	Anticipated project milestones include: • July - October 2014: Develop scope of work and outreach to stakeholders, including industry. • December 2014: post RFPs • March 2015: award contract to convene workgroup, research technology options, and report results • April 2015 – October 2016: conduct research and stakeholder engagement; conduct technology workshop • June 2017: Completed Report.
Estimated Budget	$150,000 for contractual support, research, industry workshops and project management.
Outputs / Deliverables	• Research and quantification of vehicle leaks and review toxics loading study assumptions related to petroleum loadings to Puget Sound. Seek data or model estimates on vehicle leak rates and vehicle components of concern.
Short-term Deliverables	• Engage industry on technology opportunities to reduce drips and leaks, including efforts on engine design efforts to minimize leaks; research on gasket sealing materials, etc. • Produce report with recommendations and funding needs for future actions.
Intermediate Outcomes	• Less vehicle leaks. • Innovative technology for leak prevention and detection systems in new cars. • Longer lasting seals and gaskets.
Long-Term Outcomes	• Reduced vehicle leaks and petroleum loading to Puget Sound. • Improved watershed water quality.
CWA Programs	4 and 6

Section C. Toxics Science

Toxics Science Strategy Summary

Round 5 and 6 toxic science projects are focused on providing guidance and filling data gaps in order to support local source control activities to achieve the most substantial environmental results possible. The toxics science strategy supports recommended actions in the Biennial Science Work Plan (BSWP). However, since prioritization is largely lacking in the BSWP, our strategy must rely on previous studies to prioritize toxics science needs. In 2011, Ecology completed a multi-year study to evaluate a short list of toxic chemicals in the Puget Sound basin. The assessment focused on answering several key questions about each chemical:

- Where do the chemicals come from?
- How much is being delivered?
- What delivery pathways contribute to the loading?
- What is the relative toxic hazard posed by these chemicals at observed concentrations?

Major findings of this assessment are:

- A variety of diffuse sources appear to account for the majority of contaminant releases in the Puget Sound basin. In addition surface runoff during storms was identified as the major delivery pathway for most contaminants. Since most contaminants originate from a variety sources a high priority should be given to identifying and preventing the initial release of contaminants.
- Vehicle and related activities represent an important source of a number of contaminants. Examples include; copper and zinc from brakes and tires, mercury and PAHs from fuel combustion, and petroleum from motor oil drips and leaks, and refueling operations.
- Runoff and leaching from roofing materials were estimated to be a major source of several metals, particularly cadmium, copper and zinc.
- Developed lands (commercial/industrial and residential) had higher concentrations of most COCs compared to undeveloped forest land. Source control strategies should focus on identifying and controlling contaminant releases from existing and new developments.

One of the biggest limitations of the toxics assessment was that it was limited to a small list of 17 chemicals of concern (COCs). This list was developed during Phase I of the project based on observed harm or the threat of harm to the Puget Sound Ecosystem. There is a wide range of chemicals which lack environmental information in the Puget Sound basin and have the potential to cause biological harm. Data are needed to understand the transport, trophic

transfer, and associated ecological and human health risks from a much wider range of metals (e.g. zinc and copper), PBTs, and endocrine disrupting chemicals in the basin.

Key contaminants to address include: PAHs, phthalates, petroleum, PCBs, PBDEs, copper, and zinc. In addition there is a need to gather information on a broader range of PBTs and endocrine disrupting chemicals in Puget Sound.

The data currently available indicates that a variety of diffuse sources account for the majority of contaminant releases in the Puget Sound basin. Surface runoff (especially storm events) from developed lands is the largest delivery pathway for contaminants to Puget Sound. **In order to effectively implement source control and prevention programs information is needed to target the sources of the most significant chemical releases.**

Projects underway to address sources

A number of projects are already underway using funding from the Puget Sound NEP Toxics and Nutrients grant to directly address key findings of the Puget Sound Toxics Assessment report. They include:

- Updating the Puget Sound Regional Toxics Model with new monitoring data collected during Phase 3 of the Puget Sound assessment project. These data will reduce uncertainty in the model outputs and allow an assessment of reductions needed in external loadings to achieve the Puget Sound vital sign targets for toxic chemicals.
- Analysis of Phase 1 Stormwater NPDES Permit data. This data will be useful in expanding our understanding of the contribution of different land uses to toxics chemical loadings
- Assessment of roofing materials to evaluate which roofing products have the potential to leach the most contaminants
- PAH source reduction - Grants have been awarded to continue removal of creosote pilings in Puget Sound and to enhance a wood smoke abatement program in the Pierce County non-attainment area. Creosote treated wood and wood smoke were both identified as key sources of PAHs in the region

Priority Science Needs

The data currently available indicates that a variety of diffuse sources account for the majority of contaminant releases in the Puget Sound basin. Surface runoff (especially storm events) from developed lands is the largest delivery pathway for contaminants to Puget Sound. In order to effectively implement source control and prevention programs information is needed to target the most significant chemical releases. In addition to data on releases, information on biological impacts will be needed to identify priority areas and implement a range of regulatory controls.

Key contaminants to address include: PAHs, phthalates, petroleum, PCBs, PBDEs and copper. In addition there is a need to gather information on a broader range of PBTs and endocrine disrupting chemicals in Puget Sound.

Finally, environmental monitoring is needed to evaluate the effectiveness of source control actions implemented under the Toxics/Nutrients NEP grant. Development of ambient monitoring that integrates the assessment of toxic chemical sources, exposure and effects will be critical to prioritizing source control actions and assessing the overall health of Puget Sound.

Major categories of work and linkages to the Action Agenda
All of these factors coupled with the overall strategy criteria (page 4) and anticipated budget target resulted in the following areas of focus:

1) **Pilot Study of Zinc and Copper Sources in Commercial Land Use**
2) **PCB Source Control Manual**
3) **Toxics Science Synthesis**

Toxics C1.1 (rank 2) prevent toxic chemicals from entering PS

Project Title	Pilot Study of Zinc and Copper Sources in Commercial Land Use
New or Ongoing?	New
Round(s)	5&6
Project Objective	Identify and evaluate zinc and copper sources in commercial land use for the purpose of developing control strategies for the most important non-point sources of zinc and copper in runoff.
Project Description	The Puget Sound Assessment identified zinc and copper as two of the top five pollutants in terms of both the quantity released and amount delivered to Puget Sound. In addition, the opportunities for source control were listed as high. A recent study by the State of California identified data gaps in our understanding of zinc sources. In Phase 1 the project would conduct an analysis of zinc and copper sources in a small commercial watershed. Potential sources would be mapped and releases estimated based on a combination of literature values, field observations and GIS mapping. In Phase 2 release estimates would be verified and data gaps filled through actual environmental sampling. The project would provide information that could be transferable to other watersheds to reduce the most important sources of zinc and copper in commercial areas. In addition it could provide information to evaluate the effectiveness of future source control actions.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C1.1 (rank 2):** Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment. **C2.4 (ranked 7):** Control sources of pollutants. **Near-Term Actions:** **C1.2.2** Toxics in Roofing Materials [zinc run-off] **C1.4.3** Conduct Local Source Control Business Assistance Visits [study results will help guide implementation] **Biennial Science Work Plan:** **C1.** Implement studies on persistent, bioaccumulative chemicals to understand transport, trophic transfer, and associated ecological and human health risk…
LIO Priorities or NTAs	**South Central LIO NTA 11:** Keep toxics and excess nutrients out of waste stream
Potential Partners (and Roles)	Stormwater permit holders (site access); Local Source Control Specialists (data); municipalities (site access and data).

Sustaining Funding	**Somewhat-** The data and conclusions from this pilot study will be used by local source control specialists, which will be funded outside of NEP.
Estimated Milestones	Project Start: September 2014 Phase 1 Report: September 2015 Phase 2 QAPP: December 2015 Phase 2 Report: December 2016
Estimated Budget	Total:$430,000 Phase 1/Round 5: $140,000 Phase 2/Round 6: $290,000
Outputs / Deliverables	• Phase 1 draft and final report on mapping and releases • Phase 2: QAPP for testing, draft and final report on monitoring
Short-term Deliverables	Prioritized list of zinc and copper sources in commercial land use that can be used to guide development of BMPs and alternatives assessments for the most important sources of zinc and copper.
Intermediate Outcomes	• Assist stormwater permit holders in complying with zinc and copper limits • Assist Local Source Control groups in identifying and eliminating sources of zinc and copper
Long-Term Outcomes	Reduce exposure and toxic effects from zinc and copper to the Puget Sound ecosystem.
CWA Programs	4 and 6

Toxics C1.1 (rank 2) prevent toxic chemicals from entering PS

Project Title	PCB Source Control Manual
New or Ongoing?	New
Round(s)	5
Project Objective	Compile data from PCB source identification work performed by a number of urban waters programs around the northwest. Information on processes used to conduct source tracing and actual sources identified will be compiled into a PCB manual that can be used to aid Local Source Control work.
Project Description	PCB contamination of the Puget Sound ecosystem is widespread due to their persistence and widespread use in a variety of products. Considerable effort has been devoted in several urban areas around the region (Seattle, Tacoma, Portland and Spokane) to tracking down sources of PCBs in commercial and industrial areas. To date lessons learned from these programs has not been compiled across programs. This project would compile information on techniques and processes used by each of these regional programs to trace sources and provide data on PCB sources into a Source Control Guidance Manual. This manual would be a valuable resource to aid Local Source Control programs in indentifying and reducing PCB releases. It would also directly support implementation of recommendations from the PCB Chemical Action Plan currently under development by Ecology.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C1.1 (rank 2):** Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment. **C2.4 (ranked 7):** Control sources of pollutants. **Near-Term Actions:** **C1.4.3** Conduct Local Source Control Business Assistance Visits [project results will help guide implementation] **Biennial Science Work Plan:** **C1.** Implement studies on persistent, bioaccumulative chemicals to understand transport, trophic transfer, and associated ecological and human health risk…
LIO Priorities or NTAs	**South Central LIO NTA 11:** Keep toxics and excess nutrients out of waste stream
Potential Partners (and Roles)	Seattle Public Utilities, City of Tacoma, City of Portland, and Spokane River Urban Waters (these groups would provide information).

Sustaining Funding	**Somewhat-** The manual will be used by local source control specialists, which will be funded outside of NEP.
Estimated Milestones	Project start: September 2014 Draft guidance manual: September 2015 Final guidance manual: December 2015
Estimated Budget	$140,000
Outputs / Deliverables	Draft and final source control manual
Short-term Deliverables	Provide guidance to local source control groups on successful source tracing techniques and information on products containing PCBs.
Intermediate Outcomes	Aid cleanup and local source control activities to identify and reduce PCB sources.
Long-Term Outcomes	Reduce impacts from PCBs on the Puget Sound ecosystem.
CWA Programs	4 and 6

Toxics C1.1 (rank 2) prevent toxic chemicals from entering PS

Project Title	Toxics Synthesis
New or Ongoing?	New
Round(s)	6
Project Objective	Present a summary of new information collected on toxic chemicals funded by the Toxics/Nutrients LO using NEP grant funding. The data collected will be used to update findings of Puget Sound Toxic Chemical Assessment, identify remaining data gaps, and make recommendations for implementation of toxics measures beyond the 6 year timeframe of the current NEP Toxics/Nutrients LO.
Project Description	Many of the projects related to toxic chemicals that have been funded by the Toxics/Nutrients LO were the directly related to recommendations of Puget Sound Toxic Chemical Assessment that was completed in 2011. Many of these recommendations were to collect additional data to address uncertainty in the initial assessment of sources. For example the Puget Sound Assessment determined that roofing was the major source of some metals. NEP funded a project to collect additional data on roofing which would affect the relative importance of this source. This project would look across the results of all NEP funded toxics projects to update recommendations and findings. This report would also provide comprehensive documentation of results from the NEP program and offer recommendations for actions beyond the 6 years of the current NEP program.
Action Agenda linkages	**Strategic Initiatives:** **Urban Stormwater** **Sub-strategies:** **C1.1 (rank 2):** Implement and strengthen authorities and programs to prevent toxic chemicals from entering the Puget Sound environment. [supports more effective implementation] **C2.4 (ranked 7):** Control sources of pollutants. [supports more effective implementation] **Biennial Science Work Plan:** **C1:** Synthesize information on emerging contaminants of concern. **D7:** Develop assessments of ecosystem services to help decision makers make informed decisions about restoration and protection**.**
LIO Priorities or NTAs	**STRT (No NTA assigned at present)**: Assess vulnerabilities of local communities, tribes, and natural resources to the effects of climate change and concurrent human population increases.

	South Central LIO NTA 11: Keep toxics and excess nutrients out of waste stream
Potential Partners (and Roles)	Federal, state and local jurisdictions charged with regulatory programs to control toxic chemicals.
Sustaining Funding	**No-** this project is a synthesis and therefore designed to be a one-time rollup of information completed under the NEP grant. However, the purpose of the synthesis is information for all of the toxics science projects
Estimated Milestones	Project Start: January 2016 Draft report: January 2017 Final report: March 2017
Estimated Budget	$140,000
Outputs / Deliverables	Draft and final synthesis report for toxic chemicals.
Short-term Deliverables	Update information on toxic chemicals in Puget Sound based on projects funded by the NEP grant.
Intermediate Outcomes	Information will be used to update toxic reduction efforts on the most important issues and sources related to the control of toxic chemicals in Puget Sound.
Long-Term Outcomes	Reduced toxics loading in Puget Sound through more effective implementation.
CWA Programs	4 and 6

Section D. Nutrients Implementation

Nutrients Implementation Strategy Summary

In addition ot the overall strategic criteria listed on page 4, Department fo Ecology relies on the following documents to inform the nutrients implementation strategy:

1. The *South Puget Sound Dissolved Oxygen Study Interim Nutrient Load Summary for 2006-2007* (http://www.ecy.wa.gov/pubs/1103001.pdf).
2. The *Puget Sound Dissolved Oxygen Model Nutrient Load Summary for 1999-2008* (http://www.ecy.wa.gov/pubs/1103057.pdf).
3. The *Toxics in Surface Runoff to Puget Sound: Phase 3 Data and Load Estimates* (https://fortress.wa.gov/ecy/publications/publications/1103010.pdf)
4. *Washington's Water Quality Management Plan to Control Nonpoint Sources of Pollution* (https://fortress.wa.gov/ecy/publications/publications/0510027.pdf)

Nutrients Funding Priority #1: Strategic Initiatives

The following items are the highest priorities for Rounds 5&6 funding because they are the NTAs associated with the strategic initiatives (stormwater, habitat, and shellfish) in the 2012 Action Agenda.

NTA #	Title and Description
C1.6 NTA 3	Water Quality Enforcement. Ecology, working with DOH, will increase the capacity for enforcement, and enforce all regulations pertaining to pathogens and contaminants that pollute the waters of the state to ensure achievement of approved shellfish growing water certification.
C9.4 NTA 4	Pollution Identification and Correction Programs. DOH and Ecology will administer EPA grants to help counties and tribes set up sustainable programs to identify and correct nonpoint pollution sources to improve and protect water quality in shellfish growing areas and at marine swimming beaches. These sustainable programs will have ongoing monitoring to identify pollution sources and assess effectiveness of efforts, a local sustainable funding source, and a compliance assurance component.

There are four NTAs that address nutrient issues, but only two are proposed for NEP funding.[2]

Funding Priority #2: Sub-strategies Ranked Based on Ecological Criteria and Local Priorities

[2] C7.1 NTA 3 "Pollution Control Action Team" is not proposed for additional Round 4 funding. The Whatcom County Clean Water program was fully funded in previous rounds. The C1.6 NTA 3 covers Whatcom Clean Water-like non-point inspection work in other areas. C3.2 NTA 1 "Priority Areas for Voluntary Incentive and Regulatory Programs" has largely been accomplished by previous rounds' investments in PIC programs, local TMDLs, and non-point inspectors.

The third-ranked sub-strategy is C9.1 – "Complete Total Maximum Daily Load (TMDL) studies and other necessary water cleanup plans for Puget Sound to set pollution discharge limits and determine response strategies to address water quality impairments." This sub-strategy clearly addresses nutrients (as well as toxics, pathogens, and temperature). See the Action Agenda for complete text of this sub-strategy. Local Integrating Organizations (LIOs) are proposing several Near-term actions (NTAs) for inclusion in the next update of the Puget Sound Action Agenda that support this sub-strategy. Therefore, **this priority has gained increased importance as a mechanism to address the draft LIO Near term Actions, and proposed funding reflects that**.

Since all NEP funding (plus much more) could be used to address the strategic initiatives and sub-strategies C1.1 and C9.1, no additional sub-strategies are explicitly included.

See Appendix 3 and 4 for additional pertinent information on the nutrient strategy, including loading by land use, a conceptual model, targets, pressures, existing programs, geographical foci, and gaps.

Indicator Targets for Nutrients

Specific Puget Sound Partnership ecosystem recovery targets related to nutrients include ensuring that by 2020:

- Human-related contributions of nitrogen do not result in more than 0.2 mg/L reductions in dissolved oxygen.
- At least 50 percent of all monitoring stations with suitable data have Freshwater Water Quality Index scores of 80 or higher.
- The number of impaired freshwater bodies decreases.

Main Pressures Affecting Nutrients

The main pressures that affect nutrient loadings into Puget Sound are:

1. Wastewater Treatment Plants (WWTPs) discharge treated water that usually still has high levels of nutrients. Only a few plants in the Puget Sound region are designed to remove a considerable amount of the incoming nutrient load.
2. Residential sources of nutrients include septic systems and fertilizer use. Most septic systems are designed to remove pathogens but not nutrients. Inappropriate fertilizer use can lead to nutrients reach surface and ground waters.
3. Agricultural sources nutrients include chemical fertilizers and manure. If either chemical fertilizers or manure are misapplied, nutrients can reach surface and ground water.

Existing Programs Controlling Nutrients

There are numerous existing programs to control nutrients. The action agenda highlighted:

- Stormwater management programs (permit and beyond) that emphasize source control and infiltration.
- Voluntary and regulatory management of runoff from agricultural lands.
- Voluntary and regulatory management of runoff from working forests.
- Programs to improve the siting, design, operation, and maintenance of on-site sewages systems.
- Municipal wastewater management programs that emphasize advanced treatment.
- Development and implementation of water quality clean up plans related to nutrient and dissolved oxygen impairments.
- Local and tribal pollution identification and correction programs.

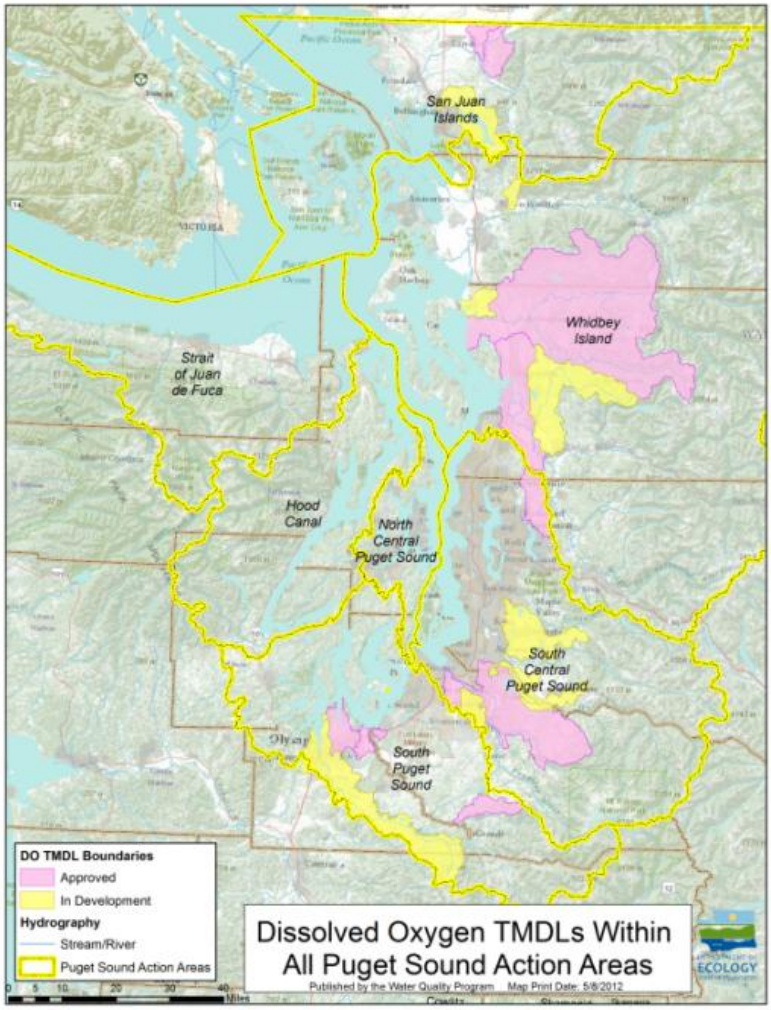
Chemicals of Concern

The toxics and nutrients NEP grant will address both phosphorus (typically the nutrient of concern in freshwater) and nitrogen (typically the nutrient of concern in marine waters). While some programs address only one of the two (such as the phosphorus detergent ban), other programs address both (such as best management practices to keep livestock away from waterways).

Geographic Focus

There are many areas in Puget Sound with nutrient issues. Within the marine water portions of Puget Sound, key areas to focus are Lynch Cove (Hood Canal - lowest dissolved oxygen levels), South Puget Sound and especially Budd Inlet (low dissolved oxygen levels), and Whidbey Basin (high loads of nutrients). In freshwater, the key areas to focus are in watersheds with TMDLs for nutrients including Lake Whatcom, Deschutes River, White River, and others.

Figure 1 - Dissolved Oxygen TMDLs



Gaps

What programs/activities are missing to control nutrients when appropriate?

Every identified pressure and strategy has at least some ongoing work to address it. Likewise, few programs have sufficient funding to fully address every issue. Wastewater treatment plants are the most heavily regulated and have the most funding, but most plants do not focus on nutrient removal.

There are many ongoing programs for residential and agricultural sources of nutrients, but most of them are underfunded and focus solely on educational efforts and voluntary measures.

Major categories of work and linkages to the Action Agenda
All of these factors coupled with the overall strategy criteria (page 4) and anticipated budget target resulted in the following areas of focus:

1) **Extend the three active non-point inspectors currently active to June 2017**
2) **Hire one non-point inspector for South Sound, Hood Canal, and the Strait**
3) **RFP(s) for Local Total Maximum Daily Load (TMDL) studies and implementation**

Nutrients C1.6 NTA 3 Water Quality Enforcement: Extend Insp.

Project Title	Extend Nonpoint Inspector Positions
New or Ongoing?	Ongoing
Round(s)	5
Project Objective	Reduce nutrient loading to Puget Sound by identifying sources of pollution and providing comprehensive implementation support to install best management practices (BMPs).
Project Description	Department of Ecology currently has three nonpoint inspector positions working in the primarily agricultural counties of Puget Sound (Snohomish, Skagit, and Whatcom). They may provide assistance in other Puget Sound areas as needed. These positions are vital to preventing nutrients from entering watersheds and providing a technical assistance and enforcement backstop, when needed, for active Pollution Identification, and Correction (PIC) Programs. These positions will begin expiring summer 2015. This funding would extend all three positions until June 2017.
Action Agenda linkages	**Strategic Initiatives:** **Shellfish Beds, Habitat Restoration** [from successful BMP implementation] **Sub-strategies:** **C1.6 (ranked 4):** Increase compliance with and enforcement of environmental laws, regulations, and permits. **Near-Term Actions (NTAs):** **C1.6.3** Water Quality Enforcement. **C9.4.1** Pollution Identification and Correction Programs [non-point enforcement to many PIC programs necessary to recover shellfish beds] **Biennial Science Work Plan:** **C7:** Establish and sustain pollution identification and correction (PIC) programs to identify and fix nonpoint pollution problems.
LIO Priorities or NTAs	**Whatcom LIO 9:** Implement a Pollution Identification and Control Project in Northern Chuckanut Bay (Mud Bay) to restore the recreational shellfish area **Whatcom LIO 10:** Implement Whatcom County Pollution Identification and Control (PIC) Program **Snohomish-Stillaguamish LIO:** Agricultural Runoff

	Snohomish-Stillaguamish LIO: Pollution Identification and Correction (PIC) Project
Potential Partners (and Roles)	Conservation Districts, NRCS, tribes, local governments, and DOH: Ecology will work with CDs, NRCS, and others to provide cost share and any available technical support to implement BMPs to achieve clean water.
Sustaining Funding	**Not currently**- These project inspectors are in place to meet the increased demand for non-point inspections in order to support the Puget Sound Action Agenda, local TMDLs, and Washington Shellfish Initiative.
Estimated Milestones	Staff extended: September 2014 Project complete: June 2017
Estimated Budget	$210,000: extends three positions until June 2017.
Outputs / Deliverables	1) 75 inspections per year. 2) Complete the implementation of 20 BMP projects per year.
Short-term Deliverables	See outputs/deliverables: those deliverables are per inspector.
Intermediate Outcomes	Reduced nutrient and fecal coliform pollution to rivers, streams, and Puget Sound.
Long-Term Outcomes	Shellfish beds are open and dissolved oxygen is not impacted by excessive nutrients.
CWA Programs	4 and 6

Nutrients C1.6 NTA 3 Water Quality Enforcement: South Sound

Project Title	Nonpoint Inspector for Southern Puget Sound, West Hood Canal, and the Strait of Jan de Fuca
New or Ongoing?	New
Round(s)	5
Project Objective	Reduce nutrient loading to Puget Sound by identifying sources of pollution and providing comprehensive implementation support to install best management practices (BMPs)
Project Description	Ecology will hire one FTE for three years (September 2014 through August 2017) to conduct inspections and to oversee implementation of BMPs in southern Puget Sound (including Hood Canal and the Strait of Juan de Fuca), focusing on livestock operations. The inspector will be based out of Ecology's Southwest Regional Office in Lacey. Manure from livestock is a large source of nutrients and pathogens that negatively affect water quality. Southern Puget Sound is the most sensitive part of Puget Sound for nutrient inputs. Budd Inlet is impacted by the nutrient-rich Deschutes River; other areas in Southern Puget Sound also violate water quality standards. Hood Canal has low dissolved oxygen; streams that flow into Hood Canal need to be kept low in nutrients so human do not make the problem worse. The Strait of Jan de Fuca is currently underserved due to logistics and limited staffing.
Action Agenda linkages	**Strategic Initiatives:** **Shellfish Beds, Habitat Restoration** [from successful BMP implementation] **Sub-Strategies:** **C1.6 (ranked 4):** Increase compliance with and enforcement of environmental laws, regulations, and permits. **Near-Term Actions (NTAs):** **C1.6.3** Water Quality Enforcement. **C9.4.1** Pollution Identification and Correction Programs [non-point enforcement to many PIC programs necessary to recover shellfish beds] **Biennial Science Work Plan:** **C7:** Establish and sustain pollution identification and correction (PIC) programs to identify and fix nonpoint pollution problems.
LIO Priorities or NTAs	**STRT (No NTA assigned at present):** Implementation of water quality cleanup plans for Sequim-Dungeness Bay and East Jefferson County Clean Water Districts

	STRT 4a: Implement the City of Port Townsend's Shoreline Master Program through Public Education and Incentive Programs **Hood Canal LIO:** Hood Canal Pollution Identification and Correction (PIC) Program.
Potential Partners (and Roles)	Conservation Districts, NRCS, tribes, local governments, and DOH: Ecology will work with CDs, NRCS, and others to provide cost share and any available technical support to implement BMPs to achieve clean water.
Sustaining Funding	**Not currently**- This project inspector is in place to meet the increased demand for non-point inspections in order to support the Puget Sound Action Agenda, local TMDLs, and Washington Shellfish Initiative.
Estimated Milestones	1) Staff hired September 31, 2014 2) Staff trained and program at full speed by March 31, 2015. 3) Project complete by August 30, 2017.
Estimated Budget	$320,000- One Environmental Specialist 3 (ES3) for three years
Outputs / Deliverables	1) 75 inspections per year. 2) Complete the implementation of 10 BMP projects per year.
Short-term Deliverables	See outputs/deliverables
Intermediate Outcomes	Reduced nutrient and fecal coliform pollution to rivers, streams, and Puget Sound.
Long-Term Outcomes	Shellfish beds are open and dissolved oxygen is not impacted by excessive nutrients.
CWA Programs	4 and 6

Nutrients: C9.1 TMDLs

Project Title	Implementing Local Projects to Reduce Nutrients
New or Ongoing?	Ongoing
Round(s)	5&6
Project Objective	Reduce nutrient loading in a basin with a total maximum daily load (TMDL) or similar plan while also addressing other pollution or habitat issues. Ecology will competitively select and fund one to four projects in local areas to address nutrients in Puget Sound.
Project Description	Ecology will select one or two projects that implement a TMDL or similar plan for nutrient reduction. The TMDL can be a TMDL in progress or a TMDL that has been completed. Examples include the South Puget Sound Dissolved Oxygen Study, the Quartermaster Harbor Dissolved Oxygen Study, Hood Canal, Campbell and Erie Lakes, Lake Sammamish, Lake Ballinger, Cottage Lake, Lake Sawyer, Lake Whatcom, Fenwick Lake, Budd Inlet/Deschutes River, Clark's Creek and others. **Additional points will be awarded for projects that are supported by LIOs, that implement Local Near Term Actions (LO and proposed LIO)**, and that address multiple parameters. The projects would address low dissolved oxygen concentrations and other nutrient-related impacts.
Action Agenda linkages	**Strategic Initiatives [potentially]:** **Urban Stormwater, Shellfish Beds, Habitat Protection** **Sub-Strategies:** **C9.1 (ranked 3):** Complete Total Maximum Daily Load (TMDLs) **C1.6 (ranked 4):** Increase compliance with and enforcement of environmental laws, regulations, and permits. **C9.4 (ranked 14):** Develop and implement local and tribal pollution and identification programs. [potentially] **Near-Term Actions (NTAs):** **C1.6.3** Water Quality Enforcement. [potentially] **C9.4.1** Pollution Identification and Correction Programs [potentially] **Biennial Science Work Plan:** **C7:** Establish and sustain pollution identification and correction (PIC) programs to identify and fix nonpoint pollution problems. [potentially]
LIO Priorities or NTAs	Every LIO has at least one potential project that could fall within this investment. They are not listed because (1) there is certainly not enough funding to fund them all and (2) they were so numerous if one was omitted accidentally, we didn't want it to appear it was not eligible.

Potential Partners (and Roles)	Partners are dependent on the projects chosen through the competitive process.
Sustaining Funding	**Dependent on projects-** will include a sustaining funding element in local projects if applicable.
Estimated Milestones	Milestones may differ based on RFP approach. Option 1: Two smaller RFPs; Option 2: One 2 phase RFP. Below are the milestones for a 2 phase RFP: Announce RFP: September 15, 2014 Projects Start: January 1, 2015 Round 6 funds infused to successful phase 1 projects: August 30, 2015 Projects end: December 31, 2016 (two years)
Estimated Budget	Round 5: $440,000 Round 6: $1,020,000 (all pass-thru to local entities)
Outputs / Deliverables	Outputs and deliverables are dependent on the project chosen through the competitive process.
Short-term Deliverables	Short-term deliverables are dependent on the project chosen through the competitive process.
Intermediate Outcomes	Intermediate outcomes are dependent on the project chosen through the competitive process.
Long-Term Outcomes	Long-term outcomes are dependent on the project chosen through the competitive process, but will need to include lower nutrient input and increased dissolved oxygen concentrations.
CWA Programs	4 and 6

Section E. Nutrients Science

Nutrients Science Strategy Summary

Several ongoing efforts are evaluating the role of human nutrient contributions and other factors on low dissolved oxygen in marine and freshwaters of the Salish Sea watershed. Other efforts are monitoring the status and trends of nutrient-related parameters in the ecosystem. Strategic scientific investments can help identify the most beneficial management activities to implement. Additional work is needed to better understand the sources, transport, fate, and impact of human and natural nutrients in the Salish Sea ecosystem.

The driving question is whether human nutrient contributions need to be reduced now or in the future to restore or maintain the health of these waters. The question requires models that link human pressures to ecosystem endpoints. Models require extensive data to describe complex physical, chemical, and biological processes. These data collection efforts differ from traditional status and trends monitoring and may include both laboratory and field investigations.

We do not have complete knowledge of nutrient inputs, transformations, and influences on ecological endpoints. **Improving the knowledge we do have in key areas will allow us to refine and adapt our nutrient management activities to control the most critical sources or Processes with the limited resources available and avoid investments in sources or processes with little influence on local or regional water quality**.

The highest-priority nutrient science needs include uncertain but potentially influential sources, critical rate processes, and innovative monitoring using continuous sensors and remote sensing. Modeling results will help identify where human nutrients require reductions; however, we have tripled the amount of nitrogen released in the Puget Sound ecosystem, and we need to develop tools that quantify and reduce these releases from known hotspots.

The highest priorities include the following geographic areas:

- Locations and load reductions identified by ongoing marine dissolved oxygen modeling, when available.
- Contributions to areas of known low dissolved oxygen in freshwater or marine environments.

- Areas with high nutrient concentrations or relative loads in freshwater or marine environments.

See Appendix 3 for additional information.

Major categories of work and linkages to the Action Agenda
All of these factors coupled with the overall strategy criteria (page 4) and anticipated budget target resulted in the following areas of focus:

1) **Dissolve Oxygen Model Refinement and Application**
2) **Nutrients Science Synthesis**

Nutrients: C9.1 TMDLs: DO Model Refinement

Project Title	Refine sediment/water quality model and evaluate Pacific Ocean trends
New or Ongoing?	Ongoing
Round(s)	5
Project Objective	Refine Salish Sea model, evaluate trends in Pacific Ocean oxygen, perform sensitivity analyses, and provide outreach on results.
Project Description	Oxygen levels have decreased in portions of Puget Sound. Recent modeling has evaluated whether human inputs are contributing to this decline. An existing NEP project is to add a capability to simulate sediment-water exchanges, which are highly influential but highly uncertain. Other improvements are needed, such as model performance in shallow inlets where the relative impacts from human inputs are highest. Results will need to be available to broader audiences, requiring advanced computational platforms. We will also compile what is known about the 50-year decreasing trends in Pacific Ocean oxygen.
Action Agenda linkages	**Sub-strategies:** **C9.1 (ranked 3):** Complete Total Maximum Daily Load (TMDLs) **Biennial Science Work Plan:** **C6:** Implement studies of human related contributions of nitrogen to dissolved oxygen impairments in sensitive Puget Sound marine waters. Studies of human related contributions of nitrogen to dissolved oxygen impairments in sensitive Puget Sound marine waters are critical to identify the need for and elements of water quality cleanup plans. This includes completing the South Sound Dissolved Oxygen Study (Kolosseus and Roberts 2009), which will clarify the need for a South Puget Sound water quality improvement plan, and completing the development of the Puget Sound Dissolved Oxygen Model (Ecology 2011a), which will help identify areas where enhanced wastewater treatment may be needed or water quality improvements.
LIO Priorities or NTAs	**South Sound LIO:** South Puget Sound Nutrient Reduction Strategy [names DO modeling as critical element of NTA] **STRT (No NTA assigned at present):** Assess vulnerabilities of local communities, tribes, and natural resources to the effects of climate change and concurrent human population increases.
Potential Partners (and Roles)	Pacific Northwest National Laboratory (PNNL) has been the primary model developer and operator. Wastewater treatment plant dischargers, tribes, business groups, citizen groups, and academics participate on the project advisory committee.

Sustaining Funding	**No-** However, model refinements will be used after NEP funds expire.
Estimated Milestones	QAPP within 6 months of project start (presumably project starts September 2014). Draft report within 18 months of project start. Final report within 24 months of project start.
Estimated Budget	$250,000 total. $50,000 for Ecology; $200,000 to PNNL through contract.
Outputs / Deliverables	Draft and final reports.
Short-term Deliverables	Improved model performance to isolate dissolved oxygen influence from human activities.
Intermediate Outcomes	Improved management of nutrients throughout the Puget Sound ecosystem.
Long-Term Outcomes	Improved management of nutrients throughout the Puget Sound ecosystem.
CWA Programs	4 and 6

Nutrients: C9.1 TMDLs/BSWP C6 (DO Study)

Project Title	Final dissolved oxygen modeling applications
New or Ongoing?	New
Round(s)	6
Project Objective	Final model application to assess current and future human impacts to Puget Sound dissolved oxygen. This will allow for implementation of the Budd Inlet dissolved oxygen TMDL.
Project Description	Once final modifications are made to the Salish Sea dissolved oxygen model, we will reassess impacts from current and future scenarios using the tool. This effort will reanalyze the relative impacts of human contributions in the context of climate and ocean changes.
Action Agenda linkages	**Sub-strategies:** **C9.1 (ranked 3):** Complete Total Maximum Daily Load (TMDLs) **Biennial Science Work Plan:** **C6:** Implement studies of human related contributions of nitrogen to dissolved oxygen impairments in sensitive Puget Sound marine waters. Studies of human related contributions of nitrogen to dissolved oxygen impairments in sensitive Puget Sound marine waters are critical to identify the need for and elements of water quality cleanup plans. This includes completing the South Sound Dissolved Oxygen Study (Kolosseus and Roberts 2009), which will clarify the need for a South Puget Sound water quality improvement plan, and completing the development of the Puget Sound Dissolved Oxygen Model (Ecology 2011a), which will help identify areas where enhanced wastewater treatment may be needed or water quality improvements.
LIO Priorities or NTAs	**South Sound LIO:** South Puget Sound Nutrient Reduction Strategy [names DO modeling as critical element of NTA] **STRT (No NTA assigned at present):** Assess vulnerabilities of local communities, tribes, and natural resources to the effects of climate change and concurrent human population increases.
Potential Partners (and Roles)	Pacific Northwest National Laboratory (PNNL) has been the primary model developer and operator. Wastewater treatment plant dischargers, tribes, business groups, citizen groups, and academics participate on the project advisory committee.
Sustaining Funding	**No-** However, model refinements will be used after NEP funds expire.
Estimated Milestones	QAPP within 6 months of project start (presumably project starts summer 2015).

	Draft report within 18 months of project start. Final report within 24 months of project start.
Estimated Budget	Total budget is $220,000. $85,000 to go to PNNL through a contract.
Outputs / Deliverables	Draft and final reports.
Short-term Deliverables	Identify where and nutrient controls can have the greatest benefits in terms of marine dissolved oxygen.
Intermediate Outcomes	Budd Inlet DO TMDL implemented to decrease nutrients from local sources in the South Sound.
Long-Term Outcomes	Improved management of nutrients throughout the Puget Sound ecosystem.
CWA Programs	4 and 6

Nutrients: Nutrients Science Synthesis

Project Title	Nutrients Science Synthesis: What have we learned from projects funded by NEP Toxics and Nutrients, Nutrients Science?
New or Ongoing?	New
Round(s)	6
Project Objective	Compile findings and outcomes from projects funded under nutrient science
Project Description	Review projects funded in Rounds 1 through 5 under nutrient science and summarize outcomes. What have we learned and how can we use it to better manage nutrients in the Puget Sound ecosystem?
Action Agenda linkages	**Sub-strategies:** **C9.1 (ranked 3):** Complete Total Maximum Daily Load (TMDLs) **Biennial Science Work Plan:** **C6:** Implement studies of human related contributions of nitrogen to dissolved oxygen impairments in sensitive Puget Sound marine waters.
LIO Priorities or NTAs	**STRT (No NTA assigned at present):** Assess vulnerabilities of local communities, tribes, and natural resources to the effects of climate change and concurrent human population increases. **South Sound LIO 6:** South Puget Sound Nutrient Reduction Strategy
Potential Partners (and Roles)	Draft and final reports summarizing findings.
Sustaining Funding	**No-** One time synthesis. However, point of synthesis is so findings can be used into future.
Estimated Milestones	Project start December 2016. Final Report by June 2017.
Estimated Budget	$50,000. Options: Ecology conducts work or competitive RFP.
Outputs / Deliverables	Draft and final reports plus web site such as http://www.ecy.wa.gov/programs/eap/Nitrogen/Index.html.
Short-term Deliverables	Science synthesis of all nutrients science work completed under toxics and nutrients NEP grant.
Intermediate Outcomes	Leverage recent knowledge to guide effective investments on nutrient controls.
Long-Term Outcomes	Improved management of nutrients throughout the Puget Sound ecosystem.
CWA Programs	4 and 6

Section F. Local Integrating Organization Support

The Toxics and Nutrients LO looks forward to continuing our support of our local partners. When prioritizing the projects in this work plan LIO support was a major criterion. The largest fund pots on both the toxics and nutrients side of the grant support local integrating organization (LIO) draft near-term actions (NTAs).

The single largest investment on the toxics side of the cooperative agreement is local source control specialists. Local source control specialists are local government staff funded through the NEP grant. $1.06 million will be passed through to support our local partners and associated LIO NTAs in rounds 5 &6. Furthermore, the Department of Ecology has prepared a state budget package that will hopefully continue these valuable local positions after the NEP grant.

The single largest investment on the nutrients side of the cooperative agreement is local total maximum daily loads (TMDLs). In total, $1.47 million will be available for competitive bid. As in previous rounds of funding, additional points will be awarded to applications supported by an LIO. In rounds 5&6 additional points will be awarded to any application that supports a LIO NTA.

In project descriptions, there is a “LIO Prioritizes or NTA” column, in order to link all of our projects to the LIO draft NTAs they support. All projects help address at least one LIO NTA; some directly, some peripherally.

Section G. Management of Unliquidated Obligations

The following steps are being taken to reduce ULOs in rounds 5&6:

1) **Rapid allocation of funds upon the award**: We are prepared to allocate funds to be spent as soon as the award is received. This work includes having round 5 RFPs announced, fund coding prepared (so staff can begin work and charge immediately), and contracts ready to execute for pass-thru funds.

2) **Reducing the number of subawards**: The round 5 and 6 awards are anticipated to be smaller than previous toxics and nutrients NEP awards. We have also concentrated our funding to a fewer number of projects than previous rounds; investing in areas we know have a large return in investment. With this limited number of sub-awards and internal projects, monitoring and reacting to slow spending will be easier than in previous rounds.

3) **Shorter project timeframes:** Even before the EPA stretch goals of two years, the toxics and nutrients grant had scoped their proposed projects to be completed in two years in the case of external projects, and three years from the award date in the case of internal projects.

4) **List of unmet needs:** Funds being unexpectedly returned from sub-grants is a common occurrence in the environmental grant world. When it happens, we'll be ready to re-allocated and spend funding as quickly as possible. The toxics and nutrients core group is in the process of developing a list of projects and costs that support this grant and the six-year strategy, to put funds back in play as soon as possible. Cost examples include under-funded science projects (i.e. DO application in round 6), spill kits for local source control specialists, and additional wood stove removal. If a big enough portion of funding is returned we may request amending the work plan to include a proposed round 5&6 projects that didn't make the initial cut.

5) **Pass-thru "Sufficient progress" term**: LOs are required to pass many conditions down to sub-awardees. There is already a state "failure to perform" clause, if the new EPA sufficient progress term is a "pass-thru" term (AS determined by EPA) it would add additional corrective action ability to our sub-awards.

Section H. Project Sustainability

Since 2014 and 2015 funds will be used to complete the final two years of the six year strategy for toxics and nutrients, it was important to consider the sustainability of Round 5 and 6 projects. Sustainability means that the project has resulted in a new permanent structure or institution that will result in toxic and nutrients reductions in the future or projects set the stage for receiving continuing funding from other sources like the State budget. While many of the 2014/15 are sustainable, some, like inspector capacity, may be assessed in coming years to see if these are still needed to implement TMDLs and meet shellfish restoration goals. Below is a list of projects that are planned to continue after the life of the NEP award:

Landscaper Accreditation (now known as EcoPro): The reason we invested in this NTA again was round 5 funding will make the program self-sustaining without federal or state funds. This cross-cutting program trains, tests, and certifies landscapers in environmentally-friendly practices, preventing pesticide usage (toxics), reducing excess fertilizer usage (nutrients), and xeriscaping (protecting in stream flows).

Local Source Control Specialists: A budget package is being submitted by Department of Ecology to continue these local positions after NEP funding expires. Furthermore, the program is working to incorporate environmental monitoring into their efforts.
Syntheses: Both the toxics and science

Local TMDL RFP: Local sustaining funding is an important scoring criterion in this competitive application.

Syntheses: Both the NEP toxics and nutrients science programs are going to complete a synthesis to capture of the all data, findings, recommendations, successes, and lessons learned under the toxics and nutrients NEPO grant science projects. The NEP grant coordinator will conduct this work, at a summary level, for implementation projects. This can be used to determine if future funding can support ongoing needs in some areas.

Section I. Internal Sub-Award Policies and Procedures

Semi-Annual FEATS Report

In the previous award (PC-00J201) the toxics and nutrients LO tracked and reported progress via a spreadsheet that was populated by task-by-task progress reports (that are required with payment requests), a semi-annual questionnaire for the information the spreadsheet did not capture, and a fiscal information provided by our internal budget tracking system (AFRS). This information was rolled up into select success measures, project narrative, and budget tables in our main LO FEATS report.

For this award, in response to an EPA internal audit and the new coordinator's preference, sub-awardees will report via their own FEATS reports. Their reports will be rolled up into the main LO FEATS report. The individual sub-awardee FEATS will be submitted to EPA as well. The Toxics and Nutrients LO looks forward to working with the EPA to ensure both parties get the best, clear, information out of the FEATS reporting process as possible.

Sub-Award Policies and Procedures

The Department of Ecology's guide document for managing grants and loans is titled "Administrative Requirements for Recipients of Ecology Grants and Loans," also known as the "Yellow Book." The Yellow Book's purpose statement is:

This document establishes the administrative requirements for all grants and loans administered through the Washington State Department of Ecology.

You can access the "Yellow Book" at
https://fortress.wa.gov/ecy/publications/publications/9118.pdf

Since the NEP grant is based in the Water Quality Program that has had a Financial Assistance Section for many years, we are also guided by Chapters 2 (Application and Award) and 3 (Project Management) of our Policy and Procedure Manual. Currently, the manual is only posted on our intranet page. Please contact the NEP coordinator for copies of the guidance if needed.

Federally-required Quality Assurance Project Plan (QAPP) templates, guidelines, and checklist for preparing QAPPs can be found at the following link:
http://www.ecy.wa.gov/programs/eap/qa/docs/NEPQAPP/index.html

The Department of Ecology passes through all required federal terms and conditions, and NEP programmatic terms and conditions, to sub-awardees. In addition, standard state contracting

guidelines must be followed. The following state terms and conditions are included in standard sub-awards:

General Terms and Conditions
Pertaining to Grant and Loan Agreements of the Department of Ecology

A. RECIPIENT PERFORMANCE

All activities for which grant/loan funds are to be used shall be accomplished by the RECIPIENT and RECIPIENT's employees. The RECIPIENT shall only use contractor/consultant assistance if that has been included in the agreement's final scope of work and budget.

B. SUBGRANTEE/CONTRACTOR COMPLIANCE

The RECIPIENT must ensure that all subgrantees and contractors comply with the terms and conditions of this agreement.

C. THIRD PARTY BENEFICIARY

The RECIPIENT shall ensure that in all subcontracts entered into by the RECIPIENT pursuant to this agreement, the state of Washington is named as an express third-party beneficiary of such subcontracts with full rights as such.

D. CONTRACTING FOR SERVICES (BIDDING)

Contracts for construction, purchase of equipment and professional architectural and engineering services shall be awarded through a competitive process, if required by State law. RECIPIENT shall retain copies of all bids received and contracts awarded, for inspection and use by the DEPARTMENT.

E. ASSIGNMENTS

No right or claim of the RECIPIENT arising under this agreement shall be transferred or assigned by the RECIPIENT.

F. COMPLIANCE WITH ALL LAWS

1. The RECIPIENT shall comply fully with all applicable Federal, State and local laws, orders, regulations and permits.

   Prior to commencement of any construction, the RECIPIENT shall secure the necessary approvals and permits required by authorities having jurisdiction over the project, provide assurance to the DEPARTMENT that all approvals and permits have been secured, and make copies available to the DEPARTMENT upon request.

2. Discrimination. The DEPARTMENT and the RECIPIENT agree to be bound by all Federal and State laws, regulations, and policies against discrimination. The RECIPIENT further agrees to affirmatively support the program of the Office of Minority and Women's Business Enterprises to the maximum extent possible. If the agreement is federally-funded, the RECIPIENT shall report to the DEPARTMENT the percent of grant/loan funds available to women or minority owned businesses.

3. Wages and Job Safety. The RECIPIENT agrees to comply with all applicable laws, regulations, and policies of the United States and the State of Washington which affect wages and job safety.

4. Industrial Insurance. The RECIPIENT certifies full compliance with all applicable state industrial insurance requirements. If the RECIPIENT fails to comply with such laws, the DEPARTMENT shall have the right to immediately terminate this agreement for cause as provided in Section K.1, herein.

G. KICKBACKS

The RECIPIENT is prohibited from inducing by any means any person employed or otherwise involved in this project to give up any part of the compensation to which he/she is otherwise entitled or, receive any fee, commission or gift in return for award of a subcontract hereunder.

H. AUDITS AND INSPECTIONS

1. The RECIPIENT shall maintain complete program and financial records relating to this agreement. Such records shall clearly indicate total receipts and expenditures by fund source and task or object. All grant/loan records shall be kept in a manner which provides an audit trail for all expenditures. All records shall be kept in a common file to facilitate audits and inspections.

   Engineering documentation and field inspection reports of all construction work accomplished under this agreement shall be maintained by the RECIPIENT.

2. All grant/loan records shall be open for audit or inspection by the DEPARTMENT or by any duly authorized audit representative of the State of Washington for a period of at least three years after the final grant payment/loan repayment or any dispute resolution hereunder. If any such audits identify discrepancies in the financial records, the RECIPIENT shall provide clarification and/or make adjustments accordingly.

3. All work performed under this agreement and any equipment purchased, shall be made available to the DEPARTMENT and to any authorized state, federal or local representative for inspection at any time during the course of this agreement and for at least three years following grant/loan termination or dispute resolution hereunder.

4. RECIPIENT shall meet the provisions in OMB Circular A-133 (Audits of States, Local Governments & Non Profit Organizations), including the compliance Supplement to OMB Circular A-133, if the RECIPIENT expends $500,000 or more in a year in Federal funds. The $500,000 threshold for each year is a cumulative total of all federal funding from all sources. The RECIPIENT must forward a copy of the audit along with the RECIPIENT'S response and the final corrective action plan to the DEPARTMENT within ninety (90) days of the date of the audit report.

I. PERFORMANCE REPORTING

The RECIPIENT shall submit progress reports to the DEPARTMENT with each payment request or such other schedule as set forth in the Special Conditions. The RECIPIENT shall also report in writing to the DEPARTMENT any problems, delays or adverse conditions which will materially affect their ability to meet project objectives or time schedules. This disclosure shall be accompanied by a statement of the action taken or proposed and any assistance needed from the DEPARTMENT to resolve the situation. Payments may be withheld if required progress reports are not submitted.

Quarterly reports shall cover the periods January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31. Reports shall be due within thirty (30) days following the end of the quarter being reported.

J. COMPENSATION

1. Method of compensation. Payment shall normally be made on a reimbursable basis as specified in the grant agreement and no more often than once per month. Each request for payment will be submitted by the RECIPIENT on State voucher request forms provided by the DEPARTMENT along with documentation of the expenses. Payments shall be made for each task/phase of the project, or portion thereof, as set out in the Scope of Work when completed by the RECIPIENT and approved as satisfactory by the Project Officer.

   The payment request form and supportive documents must itemize all allowable costs by major elements as described in the Scope of Work. Instructions for submitting the payment requests are found in "Administrative Requirements for Recipients of Ecology Grants and Loans", Part IV, published by the DEPARTMENT. A copy of this document shall be furnished to the RECIPIENT. When payment requests are approved by the DEPARTMENT, payments will be made to the mutually agreed upon designee. Payment requests shall be submitted to the DEPARTMENT and directed to the Project Officer assigned to administer this agreement.

2. Period of Compensation. Payments shall only be made for actions of the RECIPIENT pursuant to the grant/loan agreement and performed after the effective date and prior to the expiration date of this agreement, unless those dates are specifically modified in writing as provided herein.

3. Final Request(s) for Payment. The RECIPIENT should submit final requests for compensation within forty-five (45) days after the expiration date of this agreement and within fifteen (15) days after the end of a fiscal biennium. Failure to comply may result in delayed reimbursement.

4. Performance Guarantee. The DEPARTMENT may withhold an amount not to exceed ten percent (10%) of each reimbursement payment as security for the RECIPIENT's performance. Monies withheld by the DEPARTMENT may be paid to the RECIPIENT when the project(s) described herein, or a portion thereof, have been completed if, in the DEPARTMENT's sole discretion, such payment is reasonable and approved according to this agreement and, as appropriate, upon completion of an audit as specified under section J.5. herein.

5. Unauthorized Expenditures. All payments to the RECIPIENT may be subject to final audit by the DEPARTMENT and any unauthorized expenditure(s) charged to this grant/loan shall be refunded to the DEPARTMENT by the RECIPIENT.

6. Mileage and Per Diem. If mileage and per diem are paid to the employees of the RECIPIENT or other public entities, it shall not exceed the amount allowed under state law for state employees.

7. Overhead Costs. No reimbursement for overhead costs shall be allowed unless provided for in the Scope of Work hereunder.

K. TERMINATION

1. For Cause. The obligation of the DEPARTMENT to the RECIPIENT is contingent upon satisfactory performance by the RECIPIENT of all of its obligations under this agreement. In the event the RECIPIENT unjustifiably fails, in the opinion of the DEPARTMENT, to perform any obligation required of it by this agreement, the DEPARTMENT may refuse to pay any further funds there under and/or terminate this agreement by giving written notice of termination.

   A written notice of termination shall be given at least five working days prior to the effective date of termination. In that event, all finished or unfinished documents, data studies, surveys, drawings, maps, models, photographs, and reports or other materials prepared by the RECIPIENT under this

agreement, at the option of the DEPARTMENT, shall become DEPARTMENT property and the RECIPIENT shall be entitled to receive just and equitable compensation for any satisfactory work completed on such documents and other materials.

Despite the above, the RECIPIENT shall not be relieved of any liability to the DEPARTMENT for damages sustained by the DEPARTMENT and/or the State of Washington because of any breach of agreement by the RECIPIENT. The DEPARTMENT may withhold payments for the purpose of setoff until such time as the exact amount of damages due the DEPARTMENT from the RECIPIENT is determined.

2. Insufficient Funds. The obligation of the DEPARTMENT to make payments is contingent on the availability of state and federal funds through legislative appropriation and state allotment. When this agreement crosses over state fiscal years the obligation of the DEPARTMENT is contingent upon the appropriation of funds during the next fiscal year. The failure to appropriate or allot such funds shall be good cause to terminate this agreement as provided in paragraph K.1 above.

   When this agreement crosses the RECIPIENT's fiscal year, the obligation of the RECIPIENT to continue or complete the project described herein shall be contingent upon appropriation of funds by the RECIPIENT's governing body; provided, however, that nothing contained herein shall preclude the DEPARTMENT from demanding repayment of ALL funds paid to the RECIPIENT in accordance with Section O herein.

3. Failure to Commence Work. In the event the RECIPIENT fails to commence work on the project funded herein within four months after the effective date of this agreement, or by any date agreed upon in writing for commencement of work, the DEPARTMENT reserves the right to terminate this agreement.

L. WAIVER

Waiver of any RECIPIENT default is not a waiver of any subsequent default. Waiver of a breach of any provision of this agreement is not a waiver of any subsequent breach and will not be construed as a modification of the terms of this agreement unless stated as such in writing by the authorized representative of the DEPARTMENT.

M. PROPERTY RIGHTS

1. Copyrights and Patents. When the RECIPIENT creates any copyrightable materials or invents any patentable property, the RECIPIENT may copyright or patent the same but the DEPARTMENT retains a royalty-free, nonexclusive and irrevocable license to reproduce, publish, recover or otherwise use the material(s) or property and to authorize others to use the same for federal, state or local government purposes. Where federal funding is involved, the federal government may have a proprietary interest in patent rights to any inventions that are developed by the RECIPIENT as provided in 35 U.S.C. 200-212.

2. Publications. When the RECIPIENT or persons employed by the RECIPIENT use or publish information of the DEPARTMENT; present papers, lectures, or seminars involving information supplied by the DEPARTMENT; use logos, reports, maps or other data, in printed reports, signs, brochures, pamphlets, etc., appropriate credit shall be given to the DEPARTMENT.

3. Tangible Property Rights. The DEPARTMENT's current edition of "Administrative Requirements for Recipients of Ecology Grants and Loans", Part V, shall control the use and disposition of all real and personal property purchased wholly or in part with funds furnished by the DEPARTMENT in the

absence of state, federal statute(s), regulation(s), or policy(s) to the contrary or upon specific instructions with respect thereto in the Scope of Work.

4. Personal Property Furnished by the DEPARTMENT. When the DEPARTMENT provides personal property directly to the RECIPIENT for use in performance of the project, it shall be returned to the DEPARTMENT prior to final payment by the DEPARTMENT. If said property is lost, stolen or damaged while in the RECIPIENT's possession, the DEPARTMENT shall be reimbursed in cash or by setoff by the RECIPIENT for the fair market value of such property.
5. Acquisition Projects. The following provisions shall apply if the project covered by this agreement includes funds for the acquisition of land or facilities:
    a. Prior to disbursement of funds provided for in this agreement, the RECIPIENT shall establish that the cost of land/or facilities is fair and reasonable.
    b. The RECIPIENT shall provide satisfactory evidence of title or ability to acquire title for each parcel prior to disbursement of funds provided by this agreement. Such evidence may include title insurance policies, Torrens certificates, or abstracts, and attorney's opinions establishing that the land is free from any impediment, lien, or claim which would impair the uses contemplated by this agreement.
6. Conversions. Regardless of the contract termination date shown on the cover sheet, the RECIPIENT shall not at any time convert any equipment, property or facility acquired or developed pursuant to this agreement to uses other than those for which assistance was originally approved without prior written approval of the DEPARTMENT. Such approval may be conditioned upon payment to the DEPARTMENT of that portion of the proceeds of the sale, lease or other conversion or encumbrance which monies granted pursuant to this agreement bear to the total acquisition, purchase or construction costs of such property.

N. SUSTAINABLE PRODUCTS

In order to sustain Washington's natural resources and ecosystems, the RECIPIENT is encouraged to implement sustainable practices where and when possible. These practices include use of clean energy, and purchase and use of sustainably produced products (e.g., recycled paper). For more information, see http://www.ecy.wa.gov/sustainability/.

O. RECOVERY OF PAYMENTS TO RECIPIENT

The right of the RECIPIENT to retain monies paid to it as reimbursement payments is contingent upon satisfactory performance of this agreement including the satisfactory completion of the project described in the Scope of Work. In the event the RECIPIENT fails, for any reason, to perform obligations required of it by this agreement, the RECIPIENT may, at the DEPARTMENT's sole discretion, be required to repay to the DEPARTMENT all grant/loan funds disbursed to the RECIPIENT for those parts of the project that are rendered worthless in the opinion of the DEPARTMENT by such failure to perform.

Interest shall accrue at the rate of twelve percent (12%) per year from the time the DEPARTMENT demands repayment of funds. If payments have been discontinued by the DEPARTMENT due to insufficient funds as in Section K.2 above, the RECIPIENT shall not be obligated to repay monies which had been paid to the RECIPIENT prior to such termination. Any property acquired under this agreement, at the option of the DEPARTMENT, may become the DEPARTMENT'S property and the RECIPIENT'S liability to repay monies shall be reduced by an amount reflecting the fair value of such property.

P. PROJECT APPROVAL

The extent and character of all work and services to be performed under this agreement by the RECIPIENT shall be subject to the review and approval of the DEPARTMENT through the Project Officer or other designated official to whom the RECIPIENT shall report and be responsible. In the event there is a dispute with regard to the extent and character of the work to be done, the determination of the Project Officer or other designated official as to the extent and character of the work to be done shall govern. The RECIPIENT shall have the right to appeal decisions as provided for below.

Q. DISPUTES

Except as otherwise provided in this agreement, any dispute concerning a question of fact arising under this agreement which is not disposed of in writing shall be decided by the Project Officer or other designated official who shall provide a written statement of decision to the RECIPIENT. The decision of the Project Officer or other designated official shall be final and conclusive unless, within thirty days from the date of receipt of such statement, the RECIPIENT mails or otherwise furnishes to the Director of the DEPARTMENT a written appeal.

In connection with appeal of any proceeding under this clause, the RECIPIENT shall have the opportunity to be heard and to offer evidence in support of this appeal. The decision of the Director or duly authorized representative for the determination of such appeals shall be final and conclusive. Appeals from the Director's determination shall be brought in the Superior Court of Thurston County. Review of the decision of the Director will not be sought before either the Pollution Control Hearings Board or the Shoreline Hearings Board. Pending final decision of dispute hereunder, the RECIPIENT shall proceed diligently with the performance of this agreement and in accordance with the decision rendered.

R. CONFLICT OF INTEREST

No officer, member, agent, or employee of either party to this agreement who exercises any function or responsibility in the review, approval, or carrying out of this agreement, shall participate in any decision which affects his/her personal interest or the interest of any corporation, partnership or association in which he/she is, directly or indirectly interested; nor shall he/she have any personal or pecuniary interest, direct or indirect, in this agreement or the proceeds thereof.

S. INDEMNIFICATION

1. The DEPARTMENT shall in no way be held responsible for payment of salaries, consultant's fees, and other costs related to the project described herein, except as provided in the Scope of Work.
2. To the extent that the Constitution and laws of the State of Washington permit, each party shall indemnify and hold the other harmless from and against any liability for any or all injuries to persons or property arising from the negligent act or omission of that party or that party's agents or employees arising out of this agreement.

T. GOVERNING LAW

This agreement shall be governed by the laws of the State of Washington.

U. SEVERABILITY

If any provision of this agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this agreement which can be given

effect without the invalid provision, and to this end the provisions of this agreement are declared to be severable.

V. PRECEDENCE

In the event of inconsistency in this agreement, unless otherwise provided herein, the inconsistency shall be resolved by giving precedence in the following order: (a) applicable Federal and State statutes and regulations; (b) Scope of Work; (c) Special Terms and Conditions; (d) Any terms incorporated herein by reference including the "Administrative Requirements for Recipients of Ecology Grants and Loans"; and (e) the General Terms and Conditions.

W. FUNDING AVAILABILITY

The DEPARTMENT's ability to make payments is contingent on availability of funding. In the event funding from state, federal, or other sources is withdrawn, reduced, or limited in any way after the effective date and prior to completion or expiration date of this agreement, the DEPARTMENT, at its sole discretion, may elect to terminate the agreement, in whole or part, or renegotiate the agreement, subject to new funding limitations or conditions. The DEPARTMENT may also elect to suspend performance of the agreement until the DEPARTMENT determines the funding insufficiency is resolved. The DEPARTMENT may exercise any of these options with no notification restrictions.

Section J. Budget Summary

Federal Category Budget

Please reference the SRF-424 form in our application package for a budget-by-federal category.

Project-by-Round Budget

Project	Round 5	Round 6
Local Source Control	$ 530,000	$ 530,000
Landscaper Accreditation Project	$ 160,000	$ -
Wood Stove Replacement	$ 100,000	$ 100,000
Puget Sound Clean Cars	$ 100,000	$ 50,000
Pilot Study - Metals	$ 140,000	$ 290,000
PCBs Guide Project	$ 140,000	$ -
Toxics Synthesis	$ -	$ 140,000
Local TMDLs	$ 440,000	$ 1,020,000
Extend 3 Inspectors	$ 210,000	$ -
Southwest Region Inspector	$ 320,000	$ -
D.O. modeling refinements	$ 250,000	$ -
D.O. modeling application	$ -	$ 220,000
Nutrients Synthesis	$ -	$ 50,000
Administration	$ 100,000	$ 100,000
Total	**$ 2,490,000**	**$ 2,500,000**

Round 6 Budget Flexibility Statement

The Toxics and Nutrients LO recognizes that federal budgets are hard to predict, and round 6 funds may vary greatly from our planning target of $2.5 million. If we receive less funding than anticipated we will remain flexible by implementing a ranking process to eliminate or reduce some projects in order to support projects of the highest priority. If we receive more than the planning target of $2.5 million we will refer to our "List of unmet needs" (referred to in Section G) to select the highest ranking project(s) that did not make the initial cut for rounds 5&6, or other unmet costs to support active projects.

CWA Section 320 staff costs and responsibilities

Administrative staff for the toxics and nutrients rounds 5 and 6 award:

- Blake Nelson: Environmental Planner 4 – NEP Toxics / Nutrients Grant Lead (100%)
- Tom Gries: Chemist 3 – Quality Assurance Coordinator (22%)
- Ron McBride: Environmental Planner 4 – NEP Coordinator (20%)

Match Funding for Rounds 5&6

Ecology is providing $4,990,000 (or the total amount received from EPA in rounds 5&6 if different) in match through State Toxics Control Account grants ("other" budget category).

Request Authorization for Pre-Award Costs

We request permission to solicit applications for, and start charging to, funding from this cooperative agreement as early as July 1, 2014. This will allow Ecology to publicize solicitations and enter into agreements that are ready to proceed such as the local Total Maximum Daily Load RFP, and the landscaper accreditation sub-award. We request spending authority for up to $100,000 prior to recipient of this award.

Appendix 1: Response to Comments

From March 18, 2014 – April 16, 2014, the Lead Organizations (LOs) solicited feedback on potential projects for funding under Rounds 5&6 of the Puget Sound National Estuary Program. This comment period was unique to previous NEP comment periods as it was the first since the approval of the LO six-year strategies. The guidance for creating this work plan states round 5&6 projects, although distinct projects from previous rounds, must "be consistent with the six-year LO strategies," which decreases LO flexibility in making major scope changes.

The LOs presented in Sequim (March 18), Tulalip (Match 25), and Lacey (April 1). The Toxics and Nutrients LO would like to thank the Jamestown S'Klallam and Tulalip Tribal Nations, as well as the Northwest Indian Fisheries Commission for hosting these listening sessions. Tiffany Waters' (NWIFC) coordination was flawless. LOs received a number of comments on the proposed projects. This appendix is a compilation of the comments related to toxics and nutrients and Ecology's proposed changes based on the comments.

Major changes to the projects based on comments we received include:

- The proposed PCB study/inventory was altered to a PCB manual to capture best management practices (BMPs) for local source control implementation.
- A high additional point value will be associated with local integrating organization (LIO) draft NTAs in the local TMDL RFP scoring criteria.
- This work plan is laid out in a different format than previously submitted work plans; in order to better show the logic and prioritization of proposed projects.

Please see responses to comments below for minor changes, or rationale behind not making a change (letters to be attached with final draft):

Commenter	Received	Comment	Response
Martha Kongsgaard/ Leadership Council	Comments Letter	During the March meeting, the Leadership Council questioned the focus on creosote removal and whether this truly addresses a major toxics contributor. During the presentation in	PAHs are a toxics contributor. PAHs are on Ecology's list of PBTs, which are considered the "worst of the worst," because they persist in the environment for a long time and they accumulate within organisms and/or within the food chain, in addition to having harmful effects. PAHs are toxic to organisms and are widespread in Washington's environment. There are a wide range of health effects for PAHs. Both the EPA and IARC classify several PAH compounds as known carcinogens, possible carcinogens, or probable carcinogens for humans. Cancer has also been the key endpoint for many other organisms. Other health effects include mortality, heart defects, reduced growth, immunosuppression, effects on reproduction, and

		May, it would be helpful if EPA or Ecology could provide more information on the importance of this toxic loading source.	population effects on diversity and abundance in ecosystems. Ecology is particularly concerned with PAHs effect on benthic organisms because they bind to the sediment. Ecology's PAH Chemical Action Plan (CAP) determined that creosote treated pilings are a priority because of their significant direct release to water bodies and recommended actions to reduce this source. And the Toxics Loading Study found exceedances for PAHs in sediment and in the human health criteria. Implementing recommendations from the PAH CAP are included in NTA C1.1.1 and are in line with the Toxics and Nutrients 6-year strategy.
Martha Kongsgaard/ Leadership Council Tox Imp	Comments Letter	One of the themes suggests continued funding for the landscaper accreditation program. The review drafts of the 2014 Action Agenda updates note that this action is complete and a follow-up action is not proposed (NTA C1.4.1). This action was also not part of the Stormwater Strategic Initiative in the 2012/13 Action Agenda. We would appreciate information on why this is a high priority program and suggest that next steps should be included in a 2014 near term action.	The development of the landscaper accreditation program was included as NTA C1.4.1. An NTA status report that Ecology sent to the Puget Sound Partnership in late March 2014 indicated the milestones that were completed in the development of this new program. That status report was not meant to imply that all work was complete. The first round of NEP funding supported the multi-year stakeholder process to develop the program from ground zero (administrative and governance policies, curriculum, test instruments and procedures, pilot trainings etc.). In early 2014 an administrative entity was identified to carry the program forward. To ensure a smooth transition from development to full implementation, and to protect the investment to date, further funding is recommended to ensure the success of the program. Originally proposed as a "cross-cutting" project, the landscaper accreditation program, now called ecoPro, has the potential to improve land, water and air quality in the Puget Sound region. Increased use of sustainable land care practices will reduce water use, reduce the use of toxic pesticides, reduce run-off from landscaped properties, improve habitats, reduce air emissions, protect worker safety, and lead to cleaner air, land and water and healthier communities.
Martha Kongsgaard/	Comments Letter	The Leadership Council supports	Thank you, comment noted. Staff at Department of Ecology work with members of the Science Panel.

Leadership Council Tox Sci		the proposed investments in toxics research and monitoring and ask for coordination with the Puget Sound Science Panel.	
Martha Kongsgaard/ Leadership Council Nut Imp	Comments Letter	The Leadership Council appreciates the emphasis on enforcement (NTA C1.6.3) to reduce nutrient loading.	Thank you, comment noted. We hope to continue working with landowners to prevent nutrients from entering streams and other paths to the Puget Sound.
John Cambalik	West Sound Listening Session (Sequim)	In regards to PAH and woodstove – work with local building community to reduce PAHs from wood smoke. Built Green is a good program to look at.	For the limited scope of the round 5&6 NEP work we will be removing woodstoves already in use in Pierce County, so the connection may not be strong enough. For potential future PAH preventive efforts, local green building programs including low PAH stoves or forgoing a woodstove in their checklist, could be a helpful tool.
Chris Castner	West Sound Listening Session (Sequim)	Are science projects proposed in the Biennial Science Work plan, and are they prioritized?	The science projects fall within the priorities of the biennial science work plan. However, the biennial science work plan more or less doesn't prioritize, so we have to rely on our NEP science work plans and loading studies to prioritize science needs.
John Cambalik	West Sound Listening Session (Sequim)	The Toxics and Nutrients grant should fund local ambient monitoring programs (E.g. Clallam County BIBI work – should be expanded to Jefferson County)	Given our limited round 5&6 funding our current direction is aimed at source prevention, reduction, and management based (i.e. keeping nutrients and toxics out of streams versus monitoring stream health). However, for our proposed TMDL RFP(s) effectiveness monitoring could be an eligible task on impaired streams. There may also be opportunities for this work under the NEP Watershed grant.
John Cambalik	West Sound Listening Session	Landscape accreditation program should be trickling down	That is sound advice as local landscapers are who receive the accreditation. We will likely need to foster these connections to insure the program becomes sustaining.

	(Sequim)	to the local level. You could work through Master Gardeners Association, County/Cities, and ECONets.	
San Jan LIO	West Sound Listening Session (Sequim)	You need to sustain the Landscaper Certification Program so that it takes hold.	Our Round 5/6 investments are intended to make this self-sustaining.
John Cambalik	West Sound Listening Session (Sequim)	Use local volunteer programs to promote programs like Mussel Watch.	We are not currently planning to fund Mussel Watch with Round 5/6 funds as other projects ranked higher, but if additional funds become available, we will take this into account. The biotoxin monitoring program out of Department of Health utilizes local volunteers to collect samples.
John Cambalik	West Sound Listening Session (Sequim)	Straits Commission and MRC are highlighting ocean acidification work; you may want to link with them to see what they are doing.	This is a good suggestion. We are not currently planning to fund the ocean acidification study with Round 5/6 funds as other projects ranked higher, but if additional funds become available, and we invest in ocean acidification, we will check in with these groups to see what they are doing and if there are any links there.
John Cambalik	West Sound Listening Session (Sequim)	Local Source Control Program Specialist in Port Angeles funded by the Toxics and Nutrients NEP grant is doing a great job. Continue to fund.	We plan to extend these positions using round 5&6 funding. The local source control specialists have greatly exceeded their initial deliverables.
Darlene Schanfeld	West Sound Listening Session (Sequim)	Look at cross cutting needs regarding wastewater treatment facilitates. Inste ad of just looking at process changes to	We are not planning to fund WWTP process changes or WWTP technology work with Rounds 5/6 funds as other projects ranked higher. If we invest in waste water treatment plant (WWTP) technology, we will take a cross cutting approach as you suggested. We are interested in all WWTP technologies that could address pollution issues.

		reduce nutrients, consider technology or process changes that could cut across all needs (reduce pathogens, temp, etc).	
Darlene Schanfeld	West Sound Listening Session (Sequim)	Consider more of a sectored approach for this work (see above WWTP suggestion)	If we invest in waste water treatment plant (WWTP) technology, we will take a cross cutting approach as you suggested.
John Cambalik	West Sound Listening Session (Sequim)	Look at pharmaceutical take back programs, or better technology for emerging contaminants.	It is important to address contaminants of emerging concern (CEC). However, given the limited scope, duration, and funding from the NEP grant, and other State programs to take back pharmaceuticals, we will likely not be able to invest in this area with these funds.
John Cambalik	West Sound Listening Session (Sequim)	Keep pass through direct awards to local governments.	We plan to extend the funding for local source control in the jurisdictions we are currently investing in. In other areas like local TMDLs, we will issue a competitive RFP to get the best projects.
Joel Baker	North Sound Listening Session (Tulalip)	Regarding Local Source Control, is it too incremental? How many sources are inspected?	The six year strategy for toxics and nutrients emphasizes prevention and the LSC program prevents toxic releases. Over the last two years, LSC specialists have visited 96 different small business industry sectors, including auto repair shops, medical/dental, restaurants, manufacturing and gas stations and work with small businesses to fix problems like improperly stored products/toxic wastes; improper waste disposal, potential spills, lack of secondary containment, clogged storm drains, and poor housekeeping. Over 91% of the stormwater and hazardous waste issues identified during 1,625 small business site visits during FY13-15 were corrected in a timely fashion by the businesses.
Joel Baker	North Sound Listening Session (Tulalip)	What is the incremental benefit of woodstove removal project? Pierce County is already doing this?	The investment from rounds 5&6 would remove an additional 172 wood stoves, resulting in a PAH reduction of approximately a ton over the next 30 years. Our funds build on the existing Puget Sound Clean Air Agency program, and are focused on implementing woodstove removal (opposed to administrative costs). We are investing here to implement the PAH Chemical Action Plan (CAP). The CAP

			found the largest man-made sources of PAHs are from wood-burning stoves, creosote-treated wood, and vehicle emissions. Pierce County is a logical choice, because it is out of attainment with the Clean Air Act— the only area in the state that is.
Joel Baker	North Sound Listening Session (Tulalip)	Regarding the Metals assessment Phase 1. already assessed metals so how would this map more? How would this be extrapolated to other areas – note that there is a lot of work being done in the Watershed LO.	This work is not being conducted by the Watershed LO. The project would map a specific area urban industrial area's specific sources—i.e. galvanized chain link fencing and roof flashing, for future management if a jurisdiction was too combat zinc and copper entering the Puget Sound. The project could be used as a case study for other areas.
Joel Baker		How would mussel watch CECs information be used?	This would be a unique opportunity to gather regional information on the distribution of CECs that could not be captured by evaluating data from other parts of the country.
Joel Baker		What is the motivation for the Mussel Watch Program? This work is already being done by WDFW.	Inorganic arsenic is the only metal currently being tested. This project would test a suite of contaminants not being tested.
Martha Branch	North Sound Listening Session (Tulalip)	Since San Juan County is near shipping lanes, what is the current load as a baseline of various toxins related to propulsion from ships? Having a baseline would be a useful and reasonable thing.	Our toxics loading studies of Puget Sound include the Strait of Jan de Fuca and San Juan Islands for concentrations of selected priority toxics. See: http://www.ecy.wa.gov/programs/WQ/pstoxics/index.html
Joel Baker	North Sound	How will the group decide on science projects?	The six year strategy for the Toxics and Nutrients Lead Organization contains logic tracks for selected science

	Listening Session (Tulalip)		work. The strategy incorporates recommendations from the Biennial Science Work Plan, as well as science needs identified in Puget Sound loading studies for toxics and nutrients. Nutrient science projects fund modeling needs to implement TMDLs and dissolved oxygen issues.
Joel Baker	North Sound Listening Session (Tulalip)	Will (nutrients) synthesis document happen in house or will they contract out?	This hasn't been determined yet, but we will keep your comment about the virtues of the competitive process in mind.
Joel Baker	North Sound Listening Session (Tulalip)	Will EcoPath be used for the NEP-funded assessment of shellfish and water quality?	No. We will not be funding an assessment of shellfish and water quality as other projects ranked higher project will not happen with current funding.
Martha Branch	North Sound Listening Session (Tulalip)	In the San Juan Islands, we're interested spill prevention, looking at the increased number of vessels. An oil spill will happen someday and we current oil spill contingency plans based on a comprehensive risk assessment.	This is a very important project, but our funding doesn't address spill prevention/planning. We have given your contact information to our Spills Prevention Program.
Joel Baker	North Sound Listening Session (Tulalip)	The proposed work synthesis of nutrient science work should be coordinated with PSP and EPA to integrate this LO science work into the larger synthesis body of work.	As with all Puget Sound science projects, we will be sharing the synthesis of nutrients science work conducted under the six year work strategy with the PSP, EPA and PSI. PSP will be conducting a synthesis of results of the six year strategies across all of the Lead Organizations and we expect our synthesis of nutrients science will be submitted included in that cross LO synthesis.
Joel Baker	North Sound Listening Session	Can these Puget Sound funds be used to fund freshwater Total	Yes. As long as the freshwater drainages effect Puget Sound. An example is a fertilizer reduction project on the

	(Tulalip)	Maximum Daily Load (TMDL) implementation?	Deschutes River—it helps address the Deschutes nutrients and Budd Inlet dissolved oxygen (DO) TMDLs.
Chris Castner	North Sound Listening Session (Tulalip)	If the proposed research on "metals in Puget Sound Shellfish" a reaction to recent Chinese import restrictions, or was a deliberate Action Agenda related decision made to propose this topic?	The project is the implementation of NTA 1.1.6 Identifying Emergent Contaminants. Now may have been a good time to address the NTA through shellfish due to the recent China ban resulting in questions and concerns about the metals shellfish are up taking in Puget Sound. It's down our priorities list, so will not be funded unless there is a large public outcry. [There was not.]
Andy James	North Sound Listening Session (Tulalip)	What process does the Toxics/ Nutrients LO use to prioritize and select research projects for funding?	Our six year strategy contains logic tracks for prioritization of toxics and nutrients science under this cooperative agreement. The strategy incorporates recommendations from the Biennial Science Work Plan, as well as science needs identified in Puget Sound loading studies for toxics and nutrients. Nutrient science projects fund modeling needs to implement TMDLs and dissolved oxygen issues.
Joel Baker	North Sound Listening Session (Tulalip)	How are projects awarded? Who makes the decisions and how are contracts assigned? The RFP process is a tried and true in terms of generating strong project applications.	Projects are implemented through a mix of competitive, direct, and internal awards depending on what makes the most sense. Typically, awards are direct when another agency (i.e. a local government or state agency) has the authority to execute a project. Internal awards are usual staff expenses like inspectors or science oversight (example: with modeling work most funds are passed though to PNNL to update their model, a small percentage of the funds stay at Ecology for participation). Competitive awards are the most common way we fund awards, to get strong projects. In the case of the modeling work, we are building on modeling work completed in earlier phases of the strategy.
Alan Chapman	South Sound Listening Session (Lacey)	In regards to the Local Source Control theme; is there any way to determine if problems were corrected?	Yes, 75% of the visits find a problem. Over 90% are resolved in the first visit or follow-up visit. Any unresolved problems are forwarded to Department of Ecology.
Alan Chapman	South Sound Listening Session (Lacey)	Clarification on mussel watch theme: Did the previously funded project (WDFW) not	Tissue was tested, but testing for chemicals of emerging concern (CEC) is expensive and outside the original scope. Much of the funding for this proposed project would have been for testing already harvested tissue for a suite of chemicals not originally tested for.

		include enough funds for analysis?	
Alan Chapman	South Sound Listening Session (Lacey)	Clarification on mussel watch theme: Is the project funding for the second round of sampling, or more chemicals of emerging concern (CEC) analysis response?	It would mainly be for chemicals of emerging concern (CEC) analysis, however, we will not likely be funding this work with Round 5/6 funds as other work ranked higher.
Alan Chapman	South Sound Listening Session (Lacey)	Someone should make a guess on what is needed to accomplish something – what is relative magnitude of the emerging chemicals of concern. Prioriti ze these emerging chemicals then reduce them.	Loading Studies such as "Control of Toxic Chemicals in Puget Sound" provide guidance on the magnitude of toxic loading into Puget Sound. For example, a Chemical Action Plan (CAP) was established for PAHs due to their high priority for reduction into the Puget Sound. Work is beginning to priority CECs outside of the original loading studies.
Ginny Prest	South Sound Listening Session (Lacey)	What was available in funding for CDs?	Agricultural BMP funding is still currently available. Conservation Districts (CDs) were eligible to apply for past nutrients reduction RFPs. CDs will be eligible to apply for round 5 and 6 local total maximum daily load (TMDL) RFP for TMDL implementation projects.
Alan Chapman	South Sound Listening Session (Lacey)	Who do non-point inspectors work for (state or local government)?	The non-point inspectors funded by the Toxics and Nutrients NEP grant work for the Department of Ecology.
Alan Chapman	South Sound Listening Session (Lacey)	In order for inspectors to be in the field year round, during the wet season they should conduct wet season non-point inspections and in the dry season illegal water	One inspector does inspections and compliance. This inspector helps landowners find funding for issues identified during inspections.

		withdrawals inspections.	
Alan Chapman	South Sound Listening Session (Lacey)	Non-point inspection strategy has a similarity to leading horses to water– effective in some places and not in others (i.e. you can lead a horse to water, but not make them drink).	We agree that effective inspection techniques differ in different areas. Inspectors supported through this funding will be effective by knowing their areas, developing and maintaining local relationships and having expertise regarding inspection approaches that are effective in reaching landowners to implement appropriate BMPs.
Dave Peeler	South Sound Listening Session (Lacey)	Funding the dissolved oxygen (DO) refinements in the nutrients sources model should be top priority among nutrients science projects.	It is among our top priorities for nutrients science, as the refinements are needed to complete the Budd Inlet and south sound DO model. Once refined it will accurately identify nutrients sources for reduction implementation (i.e. wastewater treatment plants, agriculture, homeowner runoff).
Alan Chapman	South Sound Listening Session (Lacey)	How is this model coordinated with other models? Have heard that PNNL is dealing with compliance but UW is dealing with Sound Wide.	All three models depend on the sediment inputs. This is a "must" to use for regulatory or management uses. With model refinements Ecology can show nutrient loading from WWTPs, which can impact permits.
Alan Chapman	South Sound Listening Session (Lacey)	Is there a website where each project is listed?	Yes, the Puget Sound Partnership Website contains project lists for previous funding rounds , but needs to be updated. Ecology's website lists tox/nuts projects through March 2013. We plan to update this after submission of the round 5&6 work plan—likely July 2014.
Chris Castner	South Sound Listening Session (Lacey)	Is it my understanding that the last series of slides (nutrients science) is about proposed ideas that they would be accepting RFPs for?	It depends on the project if it would make sense to put it out for RFP or not. In the case of the modeling, it makes the most sense to pass most of the funding thru to Pacific Northwest Nation Laboratory as that's the model we have been using. Other projects like TMDL development would be an RFP.
Chris Castner	South Sound	Do not do any projects that will	All of the projects we will invest in rounds 5 and 6 will support a NTA, highly ranked substrategy, or support a

	Listening Session (Lacey)	not inform NTA implementation resulting in immediate results for Puget Sound.	science question that will influence implementation to achieve a NTA or highly ranked substrategy of the Action Agenda. The rationale for each highly prioritized project will be stated in the round 5&6 work plan.
Strait Ecosystem Recovery Network	Comments Letter	[In response to "are these the right themes?"] Yes. Consider conducting the proposed science studies in the vicinity of wastewater treatment plant outfalls and non-point sources of pollutants, such as stormwater outfalls and runoff from bio-solids land applications.	We will take WWTP outfalls into account in our science project sampling and modeling efforts.
Strait Ecosystem Recovery Network	Comments Letter	Work Plans should recognize the local NTAs recently submitted by LIOs for the 2014-2016 Puget Sound Action Agenda update. Some of our local NTAs submitted by the Strait ERN LIO for this update of the Action Agenda appear to be in alignment with the priorities outlined by the toxics portion of the Toxics and Nutrients Grant Program at the Listening Session.	We have. Please see individual projects for linkages or Section F. Local Integrating Organization Support. We look forward to supporting the LIOs when possible.

Strait Ecosystem Recovery Network	Comments Letter	We would prefer a directed subaward to implement nutrient loading reduction projects in high priority watersheds. Directed sub-awards reduce the overall workload associated with developing proposals… most of which, ultimately, will not be funded.	With limited funding, local direct awards from state or federal funds would be spread too thin and if directed to only a few local areas, we may leave out others that also need funding. A competitive process allows local watersheds to make a case for priority. We will examine whether or not a single competition for TMDL implementation funds would be possible versus two competitions to reduce administrative burden on local jurisdictions.
Joel Baker	Comments Letter	In several cases, funds are targeted to supplement existing regulatory---required programs, and neither the incremental benefit nor the approach to assessing effectiveness of these investments are clear.	See responses to individual examples below. These projects were identified based needs to achieve the outcomes in the Action Agenda. Supplementing existing programs can be beneficial as funds are more likely to go towards straight implementation, instead of administrative costs.
Joel Baker	Comments Letter	For example, how will NEP funds specifically enhance the Pierce County woodstove replacement program, a large, well---established program administered by the Puget Sound Clean Air Agency	Implementing recommendations from the PAH CAP are included in NTA C1.1.1 and are in line with the Toxics and Nutrients 6-year strategy. An estimated 172 additional woodstoves will be removed with rd. 5&6 funding, an approximate 1 ton reduction of PAH over the next 30 years. PAHs are a toxics contributor. PAHs are on Ecology's list of PBTs, which are considered the "worst of the worst," because they persist in the environment for a long time and they accumulate within organisms and/or within the food chain, in addition to having harmful effects. PAHs are toxic to organisms and are widespread in Washington's environment. There are a wide range of health effects for

		as part of the SIP for PM2.5?	PAHs. Both the EPA and IARC classify several PAH compounds as known carcinogens, possible carcinogens, or probable carcinogens for humans. Cancer has also been the key endpoint for many other organisms. Other health effects include mortality, heart defects, reduced growth, immunosuppression, effects on reproduction, and population effects on diversity and abundance in ecosystems. Ecology is particularly concerned with PAHs effect on benthic organisms because they bind to sediment.
Joel Baker	Comments Letter	What is the effectiveness of using NEP funds to add additional inspectors or to fund loading reductions required by existing TMDLs?	These inspectors do support TMDLs, but are largely in place to support the Pollution Identification and Correction Programs (PIC) being implemented under the Pathogens LO. They are primarily working in areas with high agriculture and shellfish resources. They can provide an enforcement backstop in cases where outreach and technical assistance fail. A State enforcement presence is needed where local governments are not actively taking an enforcement role.
Joel Baker	Comments Letter	Neither the toxics nor nutrient implementation strategies appear to include assessment of their effectiveness.	The effectiveness monitoring section of the six-year strategy (as well as the six year strategy) has been attached for your reference. The approach is to balance effectiveness monitoring with implementation. The Action Agenda is largely implementation-based, and overall the toxics and nutrients grant reflects that. However, we do hope to assess program effectiveness to a large degree with the syntheses.
Joel Baker	Comments Letter	Proposal lacks significant external collaborations, strategic thinking and recognition of regional priorities	Proposed projects for 2014 and beyond are following current priorities identified in the Toxics and Nutrients 6 year strategy, NTAs in Action Agenda, EPA strategic initiatives, and the Biennial Science Work Plan which were the products of multi-stakeholder processes involving a wide range of organizations. To further develop strategic priorities for funding under this grant, Ecology consulted scientific synthesis work such as the Puget Sound Toxics Loading Study and results of Puget Sound DO modeling. This logic track is included in the six year strategy.
Joel Baker	Comments Letter	LO has lost several experienced scientists and managers from both EPA and Ecology raising concerns about remaining staffs	Technical representatives on the Toxics and Nutrients LO core team have not changed since the beginning of the LO process and EPA and Ecology contract managers consult with a wide range of technical experts at their respective agencies and throughout the management conference, as needed.

		ability to execute program	
Joel Baker	Comments Letter	Lack of priority setting aligned with pressing Puget Sound issues. (Equal division between nutrients and toxics)	Proposed projects for 2014 are following priorities identified in the Toxics/Nutrients 6 year strategy, which includes linkages to NTAs in Action Agenda, EPA strategic initiatives and the Biennial Science Work Plan. The division of resources between nutrients and toxics was established by Ecology management at the beginning of the LO process. Both toxics and nutrients have been identified as needs in the Action Agenda.
Joel Baker	Comments Letter	Lack of learning from previous studies	The PSTLA guided recommendations. As part of developing proposed projects for funding a review of available information is always conducted so efforts will not be duplicated.
Joel Baker	Comments Letter	(a) The proposed 'metal sources assessment project' is an Extremely naïve study that ignores years of field assessments, including a significant amount of money spent by local jurisdictions as part of their stormwater permits. Ecology Has data from a large number of study sites where zinc and copper were monitored coming off a variety of industrial, commercial, and residential properties. The proposed study would repeat these studies without benefit of first analyzing those data. How would 'local sources of	Data from the PSTLA and a review of information from the NPDES stormwater program indicates that runoff from commercial/industrial lands has higher concentrations of contaminants. However, neither program has comprehensively investigated what materials are the most significant sources. In addition a review of available information conducted for the State of California "Zinc Sources in California Urban Runoff" provided recommendations on data gaps in our understanding of zinc sources. This proposed study would utilize existing information on copper and zinc sources to the extent possible. New data would only be collected to fill data gaps. The information would be used to develop a list of source control actions to address the most important sources of copper and zinc.

		metals mapped and assessed' from one additional watershed be useful?	
Joel Baker	Comments Letter	(b) Evaluating organic chemical sources. The focus on PCBs is difficult to understand. Setting aside the millions spent very similar work in the Duwamish and Commencement Bay (which did not seem to inform this proposed work), NEP funds were used to conduct a PCB source mass balance in Lake Washington, with ambiguous results. Other than some purported minor inadvertent production of lower chlorinated PCB congeners in some currently manufactured products (an idea that has not been quantified and, in any case focuses on low---risk congeners), there is virtually no source control motions for PCBs. This issue is abundantly	This project would compile information from existing programs in Seattle, Tacoma, Portland and Spokane concerning source tracing approaches and sources identified into a Local PCB Guidance manual. We disagree with the statement that there are no source control options for PCBs. All of these programs have successfully identified and removed PCB sources.

		described in the literature.	
Joel Baker	Comments Letter	(c) Roofing study. This LO previously funded a $500K study that was largely inconclusive (very few compounds were detected in roof runoff—a finding that was largely predictable given the materials used in roofing materials). In reviewing that report, several experimental design flaws are evident, including analyzing compounds (e.g., brominated diphenyl ethers) that were never used in roofing materials, using insufficiently insensitive analytical methods (resulting in non-detects), and not including copper-bearing flashing and gutter materials (which, along with moss treatments are the well-known sources of zinc and copper in roof runoff). Despite these problems, the earlier study	This project is not proposed to be funded in Round 5. The previously NEP funded roofing study was intentionally designed to only assess one component of roofing systems. Results indicate that several roofing materials were releasing metals. Overall, metals concentrations were lower than those used in the PSTLA from complete roofing systems indicating other components (flashings, gutters, etc) could be important sources. Sensitive analytical methods for organics were used in this study indicating the materials tested were not releasing significant amounts of the target compounds. Metals were routinely detected in runoff.

		concluded that roof runoff was likely grossly overestimated in the early toxics release report. So, why study it further?	
Joel Baker	Comments Letter	(d) Adding PPCP and PFASs sampling to PSEMP. Prior NEP funds were used to measure these chemicals in Bellingham Bay and Elliott Bay, and the proposal is to repeat the study in Commence-ment Bay. A rationale scientific process would interpret the findings from the prior studies before proposing additional work (it is unlikely the findings in Commencement will be much different than Elliot). There is also no link to the USGS field campaign measuring these same chemicals in the Puyallup River, the main freshwater source to Commencement Bay.	This project is not proposed to be funded in Round 5. The purpose of the project was to collect a baseline of PPCPs/PFA in sediments from Commencement Bay that could be used to evaluate future conditions. A review of results from Bellingham Bay and Elliott Bay did show differences in concentrations levels between the two bays. Consequently, a rational conclusion would be that differences could be expected in Commencement Bay (Long et al., 2013. Quantification of PPCPs and PFAs in the Marine Sediment of Puget Sound, Bellingham Bay; Dutch et al., 2014. Quantification of PPCPs and PFAs in the Marine Sediment of Puget Sound, Elliott Bay.)
Joel Baker	Comments Letter	(e) Mussel Watch Program (CECs). This project should be informed by the recent NOAA	This project is not proposed to be funded in Round 5. The mussel watch program in Washington has not analyzed CECs to date. This would be a unique opportunity to gather regional information on the distribution of CECs that could not be captured by evaluating data from other parts of the country.

		program that measured CECs in mussels around the country. Largely duplicative of work already done.	
Joel Baker	Comments Letter	(f) Mussels in Puget Sound Shellfish. This project should be informed by the decades---long NOAA program that measures metals in shellfish around the country. Despite what was presented at the listening session, there is a rich database of background metals levels in Puget Sound shellfish.	We do not have a project with this title. Comment may refer to Background Metals in Puget Sound Shellfish. This project is not proposed to be funded in Round 5. We conducted an extensive review of available information on metals concentration in commercially important Puget Sound shellfish. This included working with the DOH and DNR. The conclusion was background levels were not well characterized. It is unclear how a review of data from the NOAA Mussel Watch Program from other areas of the country would establish Puget Sound background levels for a wide range of shellfish.
Joel Baker	Comments Letter	A vibrant science program would solicit both ideas and talent from the broadest possible pool, using well established criteria for prioritization of ideas and peer review to choose responsive proposals from well-qualified teams… There seems to be little effort to solicit new investigators to conduct high priority studies, nor is there	Proposed projects target the highest needs of the region. While we value innovation, we also are required to focus on how projects can be used to manage the Puget Sound ecosystem. There is an extensive review process in place to generate and review projects proposed for NEP funding. This process includes many regional scientific experts within and outside Ecology. Ecology operates under an EPA approved Quality management system with strict protocols to assure that credible data is generated.

		significant third party review of proposals or blind external evaluation of work products.	
Joel Baker	Comments Letter	According to available information, 47% of funds allocated by this LO have remained within Ecology to support internal projects.	The source of the 47% number is not stated. According to the budget graphic in our presentation only 26.5% of funds remain internal (granted, that data could have been better presented). A large part of those internal costs are for inspectors that support local TMDLs and recovering shellfish beds. That allocation has remained steady. If the source of the 47% number was billed costs to EPA-to-date that is because subawards take longer to drawdown funds (reimbursement billings, often quarterly) versus salaried employees (funds draw down every 15 days)—so although nearly 3/4th of the funds are external they have a slower spending rate. Also, the Department of Ecology's mandate is to address critical needs for resource management in the State of Washington. Sometimes critical needs are internal to Ecology.

Appendix 2: Overlap with Pathogens and Watersheds Grant

There is considerable overlap with the Pathogens and Watersheds grants and the Toxics / Nutrients grants. The Pathogen and Toxics / Nutrients grants are jointly funding the clean water best management practices on agricultural land. The best management practices are expected to address both nutrient and pathogen pollution (and to a lesser extent, toxic pollution). The Pathogen-funded Pollution Identification and Correction (PIC) grant will also help focus on and resolve nutrient problems. Lastly, the Pathogen grant and the Toxics / Nutrients grant are both funding non-point inspectors at Ecology. Those inspectors will address both pathogen and nutrient issues.

The primary overlap with the Watershed Grant is for stormwater and nonpoint pollution issues. Both grants are funding projects related to both issues. The Watershed Grant strategy includes the following stormwater pieces:

- In areas of existing development, expand stormwater facility retrofits and effective stormwater source control programs. These activities will be coordinated with strategies in the Pathogens and Toxics and Nutrients proposals.
- In priority sub-basins, use finer scale watershed characterization through hydrologic modeling to establish targets for limiting impervious area and preserving vegetation. These efforts will integrate water quality, habitat, groundwater recharge, and instream flow goals. Priority activities will develop and demonstrate tools, guidance, and templates to develop and implement sub-basin goals.
- Throughout Puget Sound, accelerate the shift in stormwater management from traditional approaches to innovative low impact development (LID). Expand and improve incentive and water cleanup programs to address runoff in rural and agricultural lands. Ecology and Commerce will coordinate this work with related tasks in the Pathogens proposal.

All three grants must coordinate on water quality programs in rural areas.

Appendix 3: Toxics and Nutrients Six Year Strategy

Background Information for the Toxics and Nutrient Strategy

The Environmental Protection Agency (EPA) awarded the National Estuary Program (NEP) Lead Organization Cooperative Agreement for Toxics and Nutrients Prevention, Reduction, and Control to the Washington Department of Ecology (Ecology) in February 2011. This was one of seven NEP Lead Organization Assistance Agreements that the EPA awarded to Management Conference partners to support Puget Sound recovery. An 'Overview of the Puget Sound National Estuary Program Management Conference and Funding Agreements under CWA Section 320' is provided in Appendix 3 and introduces the general role and relationship of these Lead Organizations. Ecology and EPA developed this amended work plan to be consistent with the National Estuary Program FFY 2012 Funding Guidance.

EPA allocated $3.1 million for the Toxics and Nutrient grant in the first year, $5.6 million in the second year, and $3.5 million in the third year. EPA is allocating an additional $3.3 million in the fourth year. The first three years of funding have been allocated; this implementation strategy prioritizes the allocation of these funds for the next three years in the context of previous NEP and non-NEP funding.

Goal of the Implementation Strategy

The goal of the NEP toxics and nutrients grant is to improve both human and environmental health in the Puget Sound ecosystem by preventing, reducing and controlling toxics and nutrients from entering Puget Sound fresh and marine waters.

The goal of this strategy is to effectively and strategically allocate Puget Sound NEP toxics and nutrients money over the next few years. The Puget Sound region has been addressing, and continues to address, toxics and nutrient activities in many arenas. In order to be allocated strategically and effectively, NEP funds should fill key data and programmatic gaps in these ongoing activities. The NEP activities must fit under broader toxics and nutrients strategies for Puget Sound, the state, and the larger region.

Toxics Strategy

Information Informing the Toxics Strategy

Themes and projects were selected by analyzing the following documents/priorities:

- Priorities of 2012 Action Agenda (strategic initiative and ranked sub-strategies)
- NEP Six-Year Strategy and Workplan
- Biennial Science Workplan
- LIO Priorities
- Interim Targets
- EPA Strategic Measures
- Treaty-Protect Resources
- PSEMP Gap-Filling Recommendations
- New Toxics Strategy
- Budget, General Logistics, Readiness to Start

The 2012 Action Agenda is driving the NEP expenditures. According to the 2012 Action Agenda,

> The Action Agenda was created to drive investment and action. All of the work described is important and needed to protect and recover Puget Sound. At the same time, the Partnership recognizes the need to think practically about how work might be sequenced, both for maximum efficiency and because resources are scarce and declining. The Action Agenda should be used to guide decision making related to allocation of funding or other resources in the following way. Focus on the Strategic Initiatives: Strategic initiatives are the highest priorities for 2012 and 2013. First consider whether the new or discretionary funding source can support an unfunded or partially funded priority regional or related local action in one or more of the strategic initiatives. Strategic initiatives are the top priority for funding and the allocation of other resources. Strategic initiatives should also guide the development of policy agendas.
>
> If the funding source or other resource cannot be used to support implementation of a strategic initiative, refer to the ranked list of sub-strategies and related implementation information…. Extract the sub-strategies eligible for funding by the source in question and generally fund near-term actions or local actions related to the highest ranked sub-strategies first except where implementation information or local priorities may be used to justify funding actions related to lower-ranked sub-strategies.

Toxics Funding Priority #1: Strategic Initiatives

The following item is the highest priority for Round 4 funding because it is a Near-Term Action (NTA) associated with a strategic initiative (stormwater, habitat, and shellfish) in the 2012 Action Agenda.

NTA #	Title and Description
C2.4 NTA 1	Compliance Assurance Program. Ecology and local governments will increase inspection, technical assistance, and enforcement programs for high-priority businesses and at construction sites.

Three NTAs relate to toxics issues, but only one is proposed for NEP funding.[3]

Toxics Funding Priority #2: Sub-strategies Ranked Based on Ecological Criteria and Local Priorities

PSP ranked all of the substrategies in the Action Agenda.[4] The second-ranked sub-strategy is C1.1 – "Implement and strengthen authorities and programs to prevent toxic chemicals from entering." This sub-strategy clearly addresses toxics issues. See the Action Agenda for the full text of this sub-strategy.

Other Factors

While the Action Agenda was the dominant source for determining priorities, Ecology also considered the Puget Sound Toxics Assessment, the toxics roadmap, and the toxics reduction strategy. More information on other sources of priorities, a conceptual model, targets, pressures, existing programs, chemicals of concern, water quality standards, and gaps are in Appendix 3.

Toxics Science Strategy

In 2011, Ecology completed a multi-year study to evaluate a short list of toxic chemicals in the Puget Sound basin. The assessment focused on answering several key questions about each chemical:

- Where do the chemicals come from?
- How much is being delivered?
- What delivery pathways contribute to the loading?
- What is the relative toxic hazard posed by these chemicals at observed concentrations

Major findings of this assessment are:

- A variety of diffuse sources appear to account for the majority of contaminant releases in the Puget Sound basin. In addition surface runoff during storms was identified as the major delivery pathway for most contaminants. Since most contaminants originate from a variety sources a high priority should be given to identifying and preventing the initial release of contaminants.

[3] C1.1 NTA 3 "Fish Consumption Rates" is not proposed for funding under Round 4 of NEP. It is very important to the Puget Sound Partnership and EPA, and NEP has previously funded fish consumption rate issues, but NEP funding of this specific NTA not critical for the issue. B3.1 NTA 2 "Outfall Strategy" is not proposed for funding under Round 4 of NEP. It is an important issue, but is mostly pathogen-related. DNR, DOH, and Ecology are all working on an outfall strategy.

[4] The highest-ranked sub-strategy is related to stormwater: C2.2 ("prevent problems from new development at the site and subdivision scale"). While this sub-strategy touches on toxics and nutrients, it is clearly aimed at the watershed grant.

- Vehicle and related activities represent an important source of a number of contaminants. Examples include; copper and zinc from brakes and tires, mercury and PAHs from fuel combustion, and petroleum from motor oil drips and leaks, and refueling operations.
- Runoff and leaching from roofing materials were estimated to be a major source of several metals, particularly cadmium, copper and zinc.
- Developed lands (commercial/industrial and residential) had higher concentrations of most COCs compared to undeveloped forest land. Source control strategies should focus on identifying and controlling contaminant releases from existing and new developments.

One of the biggest limitations of the toxics assessment was that it was limited to a small list of 17 chemicals of concern (COCs). This list was developed during Phase I of the project based on observed harm or the threat of harm to the Puget Sound Ecosystem. There is a wide range of chemicals which lack environmental information in the Puget Sound basin and have the potential to cause biological harm. Data are needed to understand the transport, trophic transfer, and associated ecological and human health risks from a much wider range of PBTs and endocrine disrupting chemicals (e.g. pharmaceuticals and personal care products, brominated flame retardants, current use pesticides and nanomaterials) in the basin.

Projects underway to address sources

A number of projects are already underway using funding from the Puget Sound NEP Toxics and Nutrients grant to directly address key findings of the Puget Sound Toxics Assessment report. They include:

- Updating the Puget Sound Regional Toxics Model with new monitoring data collected during Phase 3 of the Puget Sound assessment project. These data will reduce uncertainty in the model outputs and allow an assessment of reductions needed in external loadings to achieve the Puget Sound vital sign targets for toxic chemicals.
- Analysis of Phase 1 Stormwater NPDES Permit data. This data will be useful in expanding our understanding of the contribution of different land uses to toxics chemical loadings
- Assessment of roofing materials to evaluate which roofing products have the potential to leach the most contaminants
- PAH source reduction - Grants have been awarded to continue removal of creosote pilings in Puget Sound and to enhance a wood smoke abatement program in the Pierce County non-attainment area. Creosote treated wood and wood smoke were both identified as key sources of PAHs in the region

Priority Science Needs

The data currently available indicates that a variety of diffuse sources account for the majority of contaminant releases in the Puget Sound basin. Surface runoff (especially storm events) from developed lands is the largest delivery pathway for contaminants to Puget Sound. In order to effectively implement source control and prevention programs information is needed to target the most significant

chemical releases. In addition to data on releases, information on biological impacts will be needed to identify priority areas and implement a range of regulatory controls.

Key contaminants to address include: PAHs, phthalates, petroleum, PCBs, PBDEs and copper. In addition there is a need to gather information on a broader range of PBTs and endocrine disrupting chemicals in Puget Sound.

Finally, environmental monitoring is needed to evaluate the effectiveness of source control actions implemented under the Toxics/Nutrients NEP grant. Development of ambient monitoring that integrates the assessment of toxic chemical sources, exposure and effects will be critical to prioritizing source control actions and assessing the overall health of Puget Sound.

A summary of priority science needs is:

Priority	Action	Rationale
1	Characterization of emerging contaminants (especially biological impacts from EDCs)	Little information available outside of the 17 chemicals included in the Puget Sound Assessment
2	Ambient monitoring (vital signs for toxics in fish and toxics in sediment)	Needed to assess Puget Sound vital signs and link sources, exposure and effects
3	Effectiveness monitoring of source control actions	Needed to inform adaptive management of source control strategies
4	Identification of sources from developed lands	Surface runoff during storm events from developed lands identified as largest pathway for chemicals to enter Puget Sound

Nutrient Strategy

Information Informing the Nutrients Strategy

Ecology used the following to inform the NEP nutrients strategy:

1. The 2012 Puget Sound Action Agenda.
2. The *South Puget Sound Dissolved Oxygen Study Interim Nutrient Load Summary for 2006-2007* (http://www.ecy.wa.gov/pubs/1103001.pdf).
3. The *Puget Sound Dissolved Oxygen Model Nutrient Load Summary for 1999-2008* (http://www.ecy.wa.gov/pubs/1103057.pdf).
4. The *Toxics in Surface Runoff to Puget Sound: Phase 3 Data and Load Estimates,* and the Ecology Nonpoint Nutrient Strategy.

According to the 2012 Action Agenda,

> The Action Agenda was created to drive investment and action. All of the work described is important and needed to protect and recover Puget Sound. At the same

time, the Partnership recognizes the need to think practically about how work might be sequenced, both for maximum efficiency and because resources are scarce and declining. The Action Agenda should be used to guide decision making related to allocation of funding or other resources in the following way. Focus on the Strategic Initiatives: Strategic initiatives are the highest priorities for 2012 and 2013. First consider whether the new or discretionary funding source can support an unfunded or partially funded priority regional or related local action in one or more of the strategic initiatives. Strategic initiatives are the top priority for funding and the allocation of other resources. Strategic initiatives should also guide the development of policy agendas.

If the funding source or other resource cannot be used to support implementation of a strategic initiative, refer to the ranked list of sub-strategies and related implementation information…. Extract the sub-strategies eligible for funding by the source in question and generally fund near-term actions or local actions related to the highest ranked sub-strategies first except where implementation information or local priorities may be used to justify funding actions related to lower-ranked sub-strategies.

Nutrients Funding Priority #1: Strategic Initiatives

The following items are the highest priorities for Round 4 funding because they are the NTAs associated with the strategic initiatives (stormwater, habitat, and shellfish) in the 2012 Action Agenda.

NTA #	Title and Description
C1.6 NTA 3	Water Quality Enforcement. Ecology, working with DOH, will increase the capacity for enforcement, and enforce all regulations pertaining to pathogens and contaminants that pollute the waters of the state to ensure achievement of approved shellfish growing water certification.
C3.2 NTA 1	Priority Areas for Voluntary Incentive and Regulatory Programs. The State Conservation Commission and the Washington State Departments of Agriculture, Ecology, and Health will identify priority areas to better target and coordinate implementation of voluntary incentive and regulatory programs for rural landowners, small-acreage landowners, and working farms.
C9.4 NTA 4	Pollution Identification and Correction Programs. DOH and Ecology will administer EPA grants to help counties and tribes set up sustainable programs to identify and correct nonpoint pollution sources to improve and protect water quality in shellfish growing areas and at marine swimming beaches. These sustainable programs will have ongoing monitoring to identify pollution sources and assess effectiveness of efforts, a local sustainable funding source, and a compliance assurance component.

There are four NTAs that address nutrient issues, but only three are proposed for NEP funding.[5]

[5] C7.1 NTA 3 "Pollution Control Action Team" is not proposed for additional Round 4 funding. The Whatcom County PCAT program was fully funded in previous rounds. The C1.6 NTA 3 covers PCAT-like non-point inspection work in other areas.

Funding Priority #2: Sub-strategies Ranked Based on Ecological Criteria and Local Priorities

The third-ranked sub-strategy is C9.1 – "Complete Total Maximum Daily Load (TMDL) studies and other necessary water cleanup plans for Puget Sound to set pollution discharge limits and determine response strategies to address water quality impairments." This sub-strategy clearly addresses nutrients (as well as toxics, pathogens, and temperature). See the Action Agenda for complete text of this sub-strategy.

Since all NEP funding (plus much more) could be used to address the strategic initiatives and sub-strategies C1.1 and C9.1, no additional sub-strategies are explicitly included.

See Appendix 4 for additional pertinent information on the nutrient strategy, including loading by land use, a conceptual model, targets, pressures, existing programs, geographical foci, and gaps.

Nutrient Science Strategy

Several ongoing efforts are evaluating the role of human nutrient contributions and other factors on low dissolved oxygen in marine and freshwaters of the Salish Sea watershed. Other efforts are monitoring the status and trends of nutrient-related parameters in the ecosystem. Strategic scientific investments can help identify the most beneficial management activities to implement. Additional work is needed to better understand the sources, transport, fate, and impact of human and natural nutrients in the Salish Sea ecosystem.

The driving question is whether human nutrient contributions need to be reduced now or in the future to restore or maintain the health of these waters. The question requires models that link human pressures to ecosystem endpoints. Models require extensive data to describe complex physical, chemical, and biological processes. These data collection efforts differ from traditional status and trends monitoring and may include both laboratory and field investigations.

We do not have complete knowledge of nutrient inputs, transformations, and influences on ecological endpoints. Improving the knowledge we do have in key areas will allow us to refine and adapt our nutrient management activities to control the most critical sources or processes with the limited resources available and avoid investments in sources or processes with little influence on local or regional water quality. Better information is needed for a variety of processes or components as described below. The highest-priority nutrient science needs include uncertain but potentially influential sources, critical rate processes, and innovative monitoring using continuous sensors and remote sensing. Modeling results will help identify where human nutrients require reductions;

however, we have tripled the amount of nitrogen released in the Puget Sound ecosystem, and we need to develop tools that quantify and reduce these releases from known hotspots.

Refine Estimates of Nutrient Sources

See Appendix 5 for additional information. The table below summarizes the highest nutrient science needs for refining sources. Many sources vary geographically. The highest priorities include the following geographic areas:

- Locations and load reductions identified by ongoing marine dissolved oxygen modeling, when available.
- Contributions to areas of known low dissolved oxygen in freshwater or marine environments.
- Areas with high nutrient concentrations or relative loads in freshwater or marine environments.

Nutrient Priorities for Scientific Investigation

Topic	Pri-ority	Source	What's needed?	Why needed?	Related efforts
Develop Modeling Tools and Apply to Management Questions	**1**	**Sediment models**	**Develop links between productivity, sediment processes, and sediment fluxes**	**Influential in shallow bays**	**Ecology South Puget Sound**
Nutrient Sources	2	Sediment flux monitoring	Additional measurements to characterize spatial and temporal patterns	High magnitude and medium uncertainty	South Puget Sound, Quartermaster Harbor
Nutrient Sources	3[6]	Ocean exchanges	Additional Strait of Juan de Fuca stations, depths, or frequency	High magnitude and medium uncertainty	JEMS now online
Quantify Transport, Transformation, and Fate of Nutrients	4	Vertical exchanges	Mixing at sills, vertical advection through stratified water column	High variability and medium uncertainty	Limited studies at Admiralty Inlet, Tacoma Narrows, and Hood Canal

[6] Partially funded in Round 3

Supplement Monitoring of Key Processes and Locations	5	Remote sensing of surface processes	Spatial and temporal patterns in surface proxies for primary productivity	High variability (by location, over time)	Ecology's Eyes Over Puget Sound, ambient monitoring
Quantify Transport, Transformation, and Fate of Nutrients	6	Phytoplankton component	Biomass, community composition, continuous measurements (in time and space)	High variability and high uncertainty	Chlorophyll and fluorescence monitoring by Ecology and UW; Pacific Shellfish Institute species data
Develop Modeling Tools and Apply to Management Questions	7	Large-scale landscape model	SPARROW or similar application that links mappable attributes to freshwater quality or loads to marine waters	Missing at Puget Sound scale	USGS Pacific Northwest SPARROW (not optimized for Puget Sound)
Develop Modeling Tools and Apply to Management Questions	8	Hood Canal next steps	Modeling and monitoring to support modeling		
Supplement Monitoring of Key Processes and Locations	NA[7]	Ferry-based monitoring	Transects of salinity, temperature, and proxies for primary productivity	High variability (location, over time)	Ecology and WS Ferries, Victoria Clipper, ambient monitoring
Eelgrass: Connections to Nutrients	Un-ranked		Calculating needed reductions in nutrients to protect eelgrass beds.		

[7] Funded in Round 3

Appendix 4: Supplemental Information on Strategies

Supplemental Information on the Toxics Strategy

The key recommendations from the Puget Sound Toxics Assessment (http://www.ecy.wa.gov/puget_sound/toxicchemicals/index.html) are:

- Copper. Find ways to reduce the amount of copper that gets washed into our streams and rivers.
- Roofs. Rethink our roofs since roofing materials appear to be a significant source of copper, cadmium, zinc, and phthalates.
- Creosote-treated wood. Increase efforts to remove creosote-treated wood – a significant source of PAH – from Puget Sound.
- Petroleum. Keep working on developing strategies to reduce petroleum releases – particularly chronic spills, drips, and leaks from our cars and trucks as well as our recreational boats and small commercial vessels.

In its toxic roadmap Ecology identified prevention as the smartest, cheapest, and healthiest approach to reducing toxics threats. The focus of prevention efforts is in products and stormwater. Six identified steps are:

1. Identify chemicals of concern.
2. Gather and manage data on chemicals of concern.
3. Phase out persistent, bioaccumulative toxins (PBTs).
4. Spur use of safer alternatives.
5. Promote green chemistry and design.
6. Improve prevention tools and authorities.

In January – March 7, 2013, the Ecology solicited feedback on potential themes for funding under Round 4 of the Puget Sound National Estuary Program. During January and February, the LOs meet with the Ecosystem Coordination Board (ECB), the Science Panel (SP), Leadership Council (LC), Northwest Indian Fisheries Commission (NWIFC) and Puget Sound Tribes, and a separate Advisory Group. Ecology received a number of comments on the proposed themes. The comments and responses are included in Appendix 1. Comments on this draft work plan will be included in a future appendix.

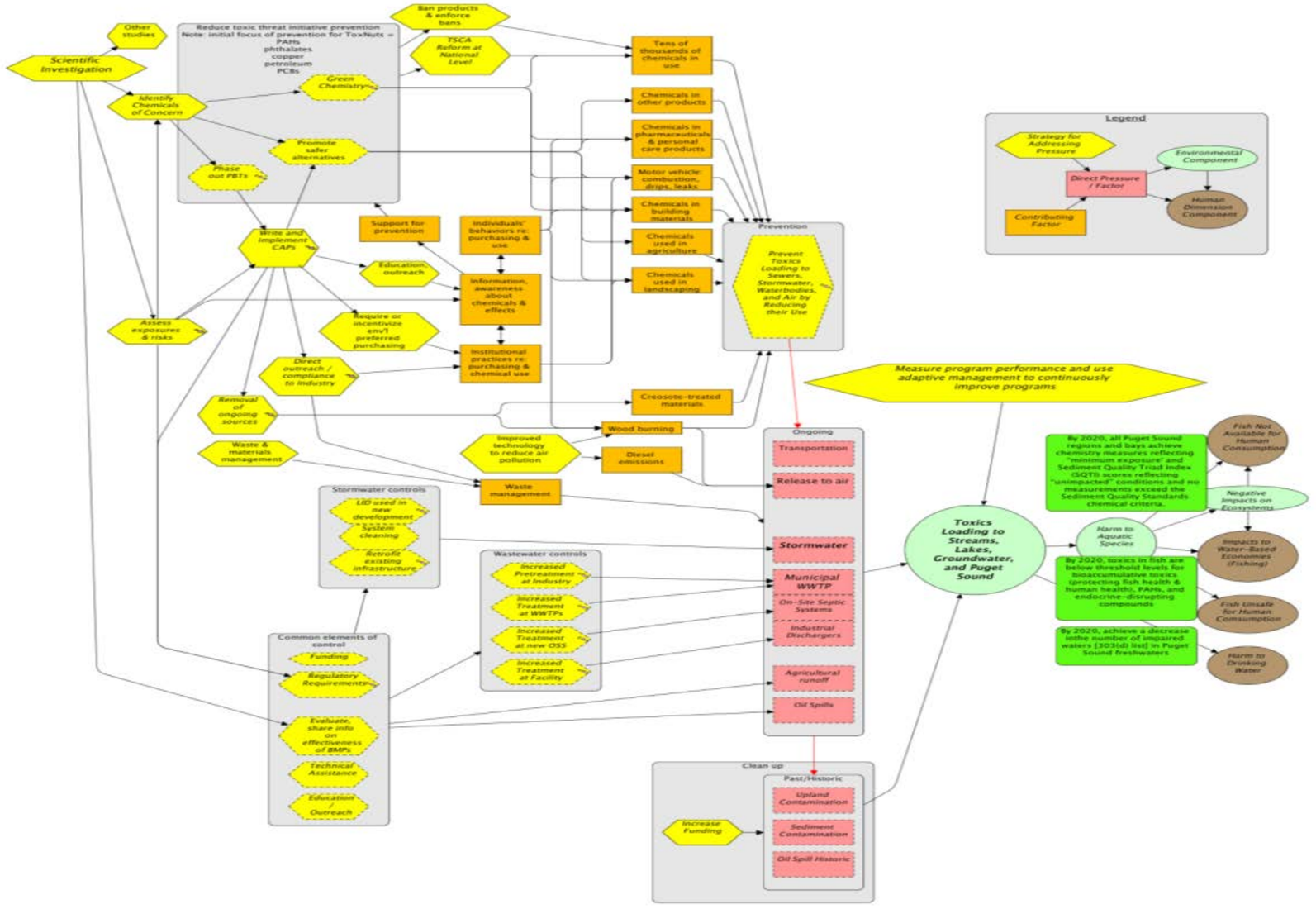
Conceptual Model

Ecology developed a conceptual model to visually display the numerous components of the toxics strategy. While the complete conceptual model with all components would be much larger, this conceptual model highlights key components that could be funded by NEP.

The following conceptual model mimics the Puget Sound Partnership's models and uses the Open Standards for the Practice of Conservation. The conceptual model identifies the environmental and human components we are interested in protecting (green and brown circles), the targets for measuring success (bright green boxes), the pressures (red boxes) that contribute to toxics loading, the contributing factors (orange boxes) that affect the pressures, and the individual strategies (orange hexagons) to address the pressures and contributing factors.

In the toxics conceptual model, the top third of the model are the prevention components that affect the pressures. The middle third are the management and control activities. At the bottom are the cleanup activities.

Figure 2 - Toxics Conceptual Model



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Indicator Targets for Toxics

Specific Puget Sound Partnership ecosystem recovery targets related to preventing the introduction or release of contaminants to the water, air, and lands of the Puget Sound basin include ensuring that by 2020:

- The levels of specific toxic chemicals, including PCBs, PDBEs, and polycyclic aromatic hydrocarbons (PAHs), and other endocrine-disrupting compounds, are below threshold levels in fish tested in Puget Sound.
- Marine sediments in Puget Sound bays and regions show minimal impacts from toxic chemicals in marine sediment quality indicators.
- The number of impaired freshwater bodies decreases.

More information about these targets is available at: http://www.psp.wa.gov/vitalsigns/index.php.

Main Pressures Affecting Toxics

The PSP has identified pressures that may affect toxics. As described in the conceptual model, the main pressures affecting toxics loading are:

- Activities related to agriculture and livestock grazing.
- Transportation-related sources including toxics released from automobile use.
- Releases to air including wood smoke, automobile exhaust, and other sources of air pollution that either directly in indirectly reaches Puget Sound.
- Stormwater conveyance of pollution from land to waterbodies. The Puget Sound Toxics Loading Assessment found that stormwater "contributed the largest loads to Puget Sound, typically accounting for more than one-half of the total loads from all pathways combined" (page 14).
- Municipal Wastewater Treatment Plants discharge toxics from households and industries. According to the Puget Sound Toxics Loading Assessment, WWTPs "generally accounted for less than one-tenth of the delivery to Puget Sound for each of the [toxics] assessed", although there were exceptions (page 14).
- On-site septic systems also discharge toxics from households and some businesses.
- Industrial discharges treat and then discharge wastewater. Some industries discharge to a WWTP while others discharge directly to waterbody.
- Oil spills are a direct source of oil and petroleum products to Puget Sound and other waterbodies.
- Already polluted sediment and soil is a source of toxics downstream.

Other pressures identified by PSP that do not affect toxics loadings to the same degree include: timber production; shoreline infrastructure; recreational activities; fin and shellfish aquaculture; exotic and nuisance species; dredging and dredged material; and military exercises.

Existing Programs Controlling Toxics

There are numerous existing programs and programs that are just starting to control toxics. Programs highlighted in the action agenda include:

Prevention

- Implementation of the state law limiting copper (and other toxic chemicals) in vehicle brake friction material
- Reviewing the PBT list and prioritizing the next PBTs for chemical action plans
- Developing and implementing a green chemistry road map
- Developing guidance to conduct chemical alternative assessments
- Completing an assessment of alternatives to commercial uses of phthalates
- Completing development of a state implementation plan for particulate air pollution in the Tacoma/Pierce County non-attainment area

Limit or Manage

- Management of the residue from auto shredding
- Local source control programs
- Stewardship programs, including those managed by the Puget Sound Partnership, stormwater permittees, and NGOs
- Hazardous waste compliance activities: inspections and responding to complaints.

Clean-up

- State and federal site cleanup activities: site identification, investigation, clean up, and monitoring

Chemicals of Concern

The Toxics and Nutrients NEP grant will focus most of its work on a short list of chemicals of concern. While there are numerous toxic chemicals that need to be addressed, focusing on a selected list of top-priority chemicals allows a more strategic, targeting approach. The chemicals of concern were chosen based on Action Agenda targets and the findings of the Puget Sound Toxics Assessment. Other chemicals can also be addressed on a case-by-case basis when there are unique opportunities to make a significant impact.

Parameter	*Reason for Selection*
PAHs	Identified in the Puget Sound Toxics Assessment; Toxics in Fish threshold for liver disease and PAH metabolites in bile of English sole.
Phthalates	Identified in the Puget Sound Toxics Assessment; Toxics in Fish threshold for reproductive impairment in English sole
Copper	Identified in the Puget Sound Toxics Assessment. Reports indicating impairment on juvenile salmonids.
Petroleum	Identified in the Puget Sound Toxics Assessment; source of PAH release
PCBs	Target in the Action Agenda; Toxics in Fish thresholds for human health and fish health risks from contaminants in the pelagic food web
PBDEs	Identified in the Puget Sound Toxics Assessment

How do emerging contaminants fit in?

Emerging contaminants can often be overlooked when focusing on specific chemicals of concern. Emerging contaminants for this strategy include endocrine disrupting compounds (EDCs) and

pharmaceuticals and personnel care products (PPCPs). The chemicals of concern tend to be the chemicals that have been used extensively and have been the subject of many scientific investigations. The Toxics and Nutrients NEP Grant has and will be used to conduct focused studies on emerging contaminants. The purpose of this work is to identify problematic chemicals as soon as possible and address these problems before they become a widespread chemical of concern.

Focus on Prevention

Prevention is the primary focus for toxics in the NEP Grant. Ecology identified prevention as the smartest, cheapest, and healthiest approach to reducing toxics threats. Since prevention efforts tend to focus on long-term solutions, we also recognize the need for shorter-term management of current releases to the environment. Managing/controlling toxics is the secondary focus. Part of the NEP grant will also address scientific investigations and adaptive management and detailed in a later section of this strategy. This strategy will not focus on cleaning up substances that have polluted air, land, and water. While this is clearly important, Ecology and EPA have clean-up programs to address these problems. NEP funds could be targeted for specific projects such as source control at these sites, but in general NEP funds will not be directed to clean up.

Geographic Focus

In most cases, prevention efforts are Sound-wide. However, some projects have a geographic focus. While many factors are involved in selecting a geographic focus for a given project, the Toxics NEP grant will focus on those areas with the most significant problems. These areas tend to be the areas with the greatest human impact such as urban bays. In some cases, such as pesticide use, it may be areas dominated by one particular land use.

Water Quality Standards

Both the marine water of Puget Sound and the fresh water tributaries have water quality standards for some, but not all, toxics. Where these standards exist, they provide a numeric target for prevention and management activities. Ecology uses Total Maximum Daily Loads (TMDLs) to determine how to meet standards. While there have only been a few TMDLs for toxics in Puget Sound to date, we expect more toxics TMDLs in the future. Future NEP funds will likely be able to help fund activities identified in a TMDL.

Gaps

Missing Programs/Activities to Control Toxics

One frequently-identified gap is that water quality regulatory programs only address a short list of specific toxics. Few implementation programs have sufficient funding to fully address every issue, but every identified pressure and strategy has at least some ongoing work to address it. Historically, more funding focuses on cleanup and control than prevention. While they have received more funding, much more is needed to address contaminated sites, stormwater treatment, and other cleanup and control programs. While prevention programs, such as green chemistry, can be a less-expensive way to address toxics, they are relatively new and have also been underfunded.

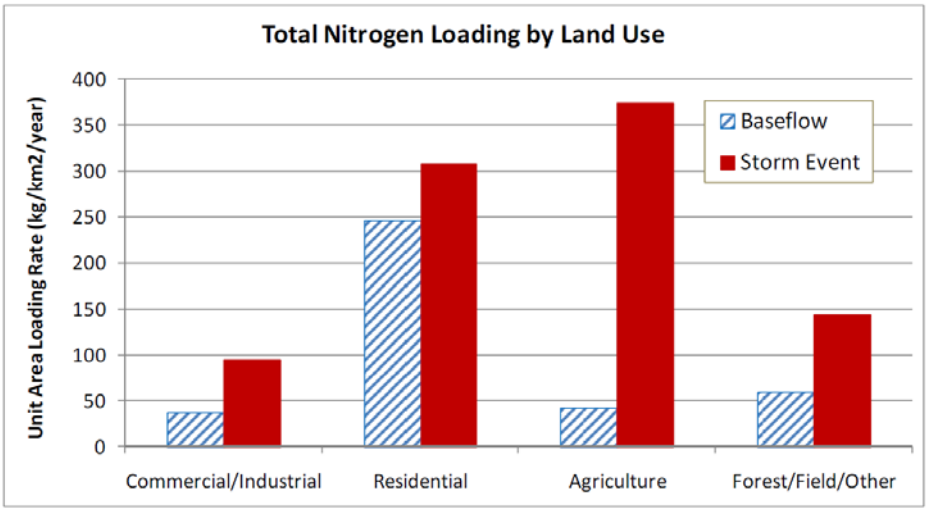
Criteria to Evaluate and Make Decisions on Programs and Activities

Funding decisions are based on the priorities identified in this document. Within a given priority, specific project details are determined based on project outputs and outcomes, feasibility, and cost. Feasibility includes issues such as schedule, previous experiences, likelihood of success, local and regional support, and ability to leverage other projects. These criteria are formally evaluated during a competitive process. The application specifically lists the criteria used for scoring individual proposals. The criteria are informally evaluated for direct awards where there is only one identified project and one lead entity.

Supplemental Information on the Nutrient Strategy

According to the *Puget Sound Dissolved Oxygen Model – Nutrient Load Summary for 1999-2008*, about 75 percent of the human sources of nitrogen to Puget Sound come from WWTPs. Likewise, in South Puget Sound (south of the Tacoma Narrows), about half of the human sources of nitrogen to Puget Sound come from WWTPs according to the *South Puget Sound Dissolved Oxygen Study Interim Nutrient Load Summary for 2006-2007.* These two studies found that most of the remaining human sources of nitrogen entered Puget Sound via rivers and streams. The key finding from the *Toxics in Surface Runoff to Puget Sound: Phase 3 Data and Load Estimates* are that residential and agricultural sources of nitrogen are a significant amount of the non-point nutrient loading to Puget Sound's rivers and streams. Unit-area loading rates for nitrogen were generally higher for the residential and agricultural sub-basins. For storm events, the median unit-area loading rates for the residential and agricultural sub-basins were 308 and 374 kg/km2/yr, respectively. In comparison, the median storm-event unit-area loading rate for the commercial/ industrial sub-basins was 94.5 kg/km2/yr, and 144 kg/km2/yr for the forested sub-basins.

Figure 3 - Nitrogen Loading by Land Use



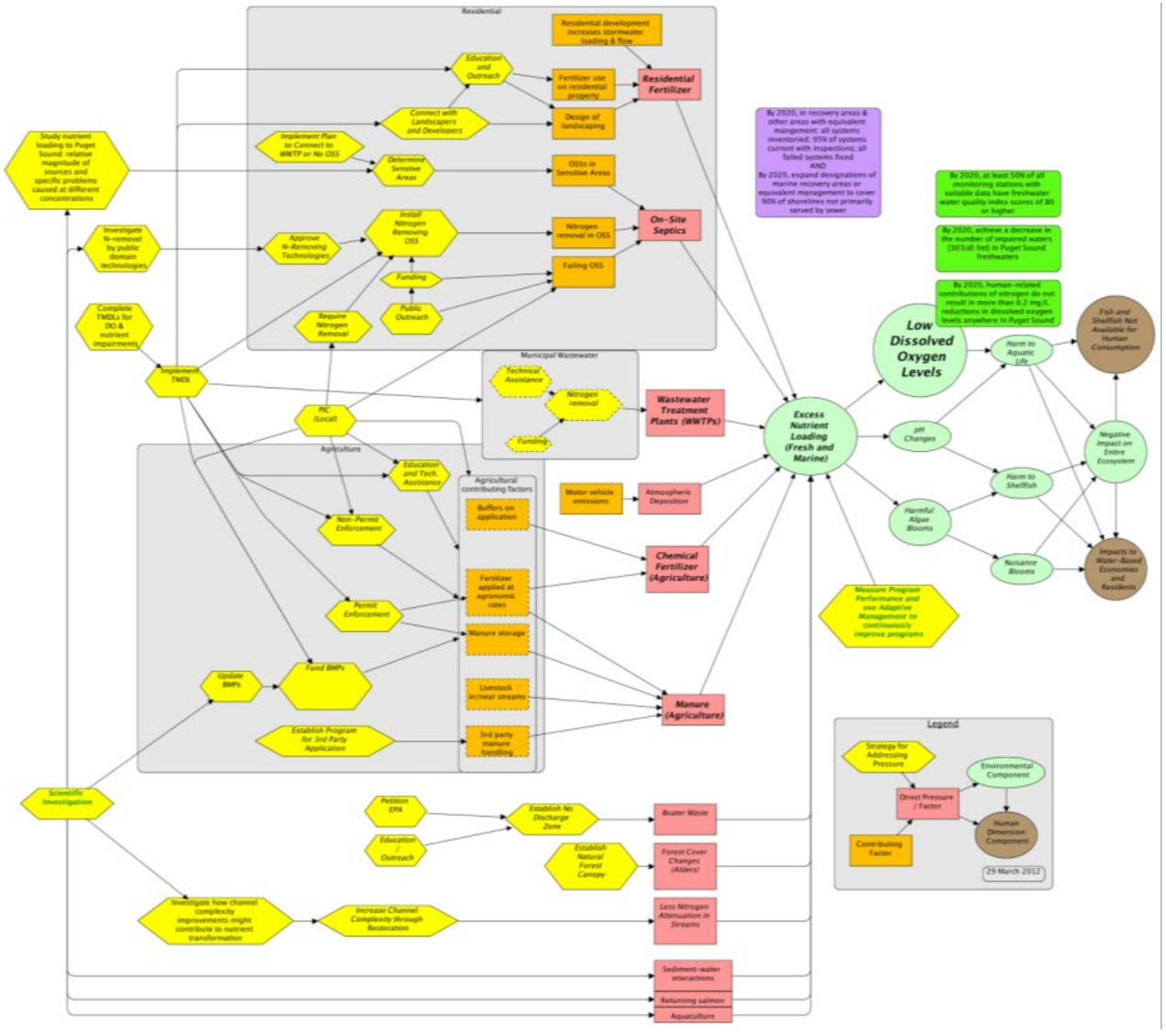
Conceptual Model

Ecology developed a conceptual model to visually display the numerous components of the nutrient strategy. While the complete conceptual model with all components would be much larger, this conceptual model highlights key components that could be funded by NEP.

The following conceptual model mimics the Puget Sound Partnership's models and uses the Open Standards for the Practice of Conservation. The conceptual model identifies the environmental and human components we are interested in protecting (green and brown circles), the targets for measuring success (bright green boxes), the pressures (red boxes) that contribute to nutrient loading, the contributing factors (orange boxes) that affect the pressures, and the individual strategies (orange hexagons) to address the pressures and contributing factors.

In the toxics conceptual model, the top grey box describes residential sources of nutrients. The middle box describes municipal WWTPs, and the lower box describes agricultural sources of nutrients. Additional sources of nutrients are included at the bottom.

Figure 4 - Nutrients Conceptual Model



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Indicator Targets for Nutrients

Specific Puget Sound Partnership ecosystem recovery targets related to nutrients include ensuring that by 2020:

- Human-related contributions of nitrogen do not result in more than 0.2 mg/L reductions in dissolved oxygen.
- At least 50 percent of all monitoring stations with suitable data have Freshwater Water Quality Index scores of 80 or higher.
- The number of impaired freshwater bodies decreases.

Main Pressures Affecting Nutrients

The main pressures that affect nutrient loadings into Puget Sound are:

1. Wastewater Treatment Plants (WWTPs) discharge treated water that usually still has high levels of nutrients. Only a few plants in the Puget Sound region are designed to remove a considerable amount of the incoming nutrient load.
2. Residential sources of nutrients include septic systems and fertilizer use. Most septic systems are designed to remove pathogens but not nutrients. Inappropriate fertilizer use can lead to nutrients reach surface and ground waters.
3. Agricultural sources nutrients include chemical fertilizers and manure. If either chemical fertilizers or manure are misapplied, nutrients can reach surface and ground water.

Existing Programs Controlling Nutrients

There are numerous existing programs to control nutrients. The action agenda highlighted:

- Stormwater management programs (permit and beyond) that emphasize source control and infiltration.
- Voluntary and regulatory management of runoff from agricultural lands.
- Voluntary and regulatory management of runoff from working forests.
- Programs to improve the siting, design, operation, and maintenance of on-site sewages systems.
- Municipal wastewater management programs that emphasize advanced treatment.
- Development and implementation of water quality clean up plans related to nutrient and dissolved oxygen impairments.
- Local and tribal pollution identification and correction programs.

Chemicals of Concern

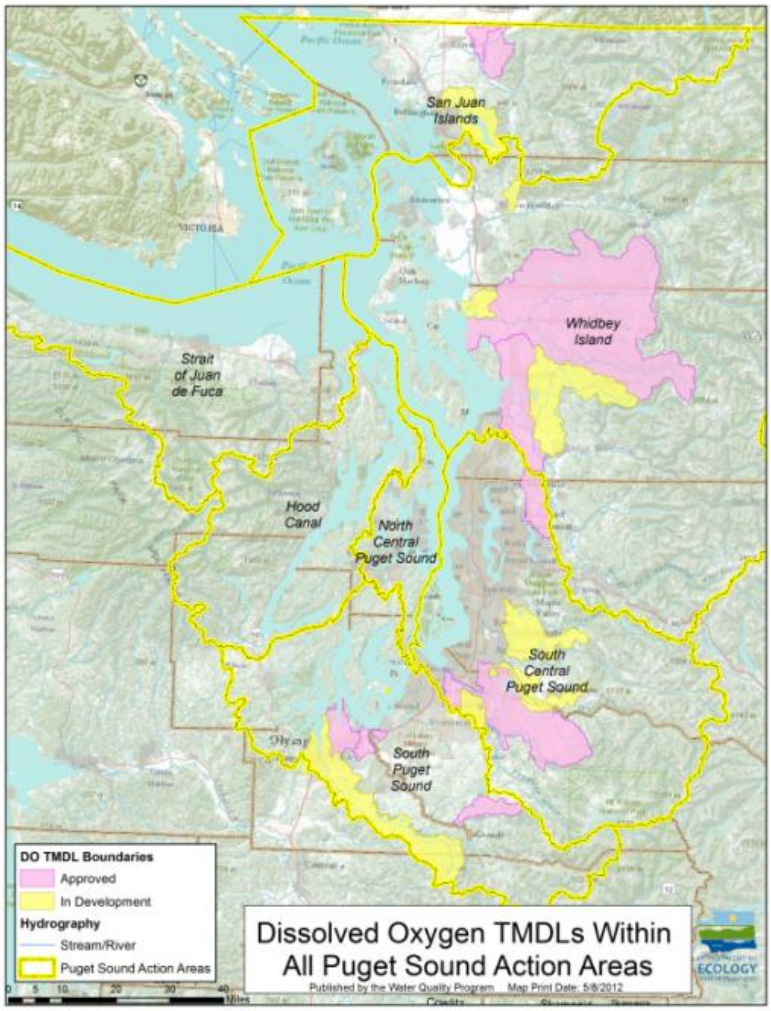
The toxics and nutrients NEP grant will address both phosphorus (typically the nutrient of concern in freshwater) and nitrogen (typically the nutrient of concern in marine waters). While some programs address only one of the two (such as the phosphorus detergent ban), other programs address both (such as best management practices to keep livestock away from waterways).

Geographic Focus

There are many areas in Puget Sound with nutrient issues. Within the marine water portions of Puget Sound, key areas to focus are Lynch Cove (Hood Canal - lowest dissolved oxygen levels), South Puget Sound and especially Budd Inlet (low dissolved oxygen levels), and Whidbey Basin (high loads of

nutrients). In freshwater, the key areas to focus are in watersheds with TMDLs for nutrients including Lake Whatcom, Deschutes River, White River, and others.

Figure 5 - Dissolved Oxygen TMDLs



Gaps

What programs/activities are missing to control nutrients when appropriate?
Every identified pressure and strategy has at least some ongoing work to address it. Likewise, few programs have sufficient funding to fully address every issue. Wastewater treatment plants are the most heavily regulated and have the most funding, but most plants do not focus on nutrient removal. There are many ongoing programs for residential and agricultural sources of nutrients, but most of them are underfunded and focus solely on educational efforts and voluntary measures.

What criteria did we use to evaluate and make decisions on programs and activities?
Funding decisions are based on the priorities identified in this document. Within a given priority, specific project details are determined based on project outputs and outcomes, feasibility, and cost. Feasibility includes issues such as schedule, previous experiences, likelihood of success, local and regional support, and ability to leverage other projects. These criteria are formally evaluated during a competitive process. The application specifically lists the criteria used for scoring individual proposals. The criteria are informally evaluated for direct awards where there is only one identified project and one lead entity.

Nutrient Science Strategy – Additional Information

Refine Estimates of Nutrient Sources

Nutrients enter Puget Sound from both external and internal sources. Based on compilations for the entire Salish Sea, the largest external contribution is the nutrient influx associated with ocean exchanges, including the influence of Pacific Ocean upwelling. The largest local sources vary by location and season, but may be either wastewater treatment plants discharging to marine waters or freshwater rivers and streams flowing into Puget Sound. Atmospheric deposition also contributes. Boater waste has not been quantified but could discharge nutrients directly to marine waters. Internal sources include nutrient fluxes between the sediments and the water column. While each pathway has been estimated, some include large uncertainty or others simply large magnitude where small changes translate to large loads.

Rivers, streams, and lakes receive inputs from natural, point, and nonpoint sources of nutrients from upstream watersheds. These sources include natural forested or undeveloped land cover; spawning salmon; or natural components of atmospheric deposition. Point sources include any upstream domestic or industrial wastewater treatment plant discharges as well as regulated stormwater runoff from permitted facilities or municipal management areas. Nonpoint sources may include contributions from disturbed forest or land cover; onsite sewage systems; fertilizer in residential, agricultural, or commercial applications; or human contributions to atmospheric deposition. Natural, nonpoint, and point sources also may influence groundwater, which in turn can affect fresh or marine water systems (described below with rate processes).

Quantify Transport, Transformation, and Fate of Nutrients

Once nutrients enter fresh or marine waters, a variety of physical, chemical, and biological processes transport and transform them and influence their eventual fate in the ecosystem. Some processes attenuate the influence on ecological endpoints such as dissolved oxygen, while others may exacerbate the influence. In general, less is known about these processes than about the sources themselves.

In both freshwater and marine ecosystems, primary producers use photosynthesis to transform dissolved nutrients into particulate biological forms. These processes vary seasonally because of the variation in light and temperature and nutrient availability. Vertical mixing in marine waters controls the amount of nutrients from lower water layers supplied to surface layers where primary producers grow. Algae blooms also display great variability in time and space. Higher trophic levels influence primary producers by grazing as primary consumers. Bacteria decompose dead algae and other organic matter and consume oxygen in the process. Each process transforms nutrients between various dissolved and particulate forms. Existing programs characterize algae biomass, productivity rates, or proxies, but none capture the tremendous variability in fresh or marine waters. Little site-specific information exists to characterize the rate processes – growth and death rates, respiration rates, or remineralization rates, for example.

The interannual variability of dissolved oxygen in the Salish Sea appears driven by variability in nutrients advected from the Pacific Ocean through the lower layers of the Strait of Juan de Fuca. Vertical advection of this oceanic source may be the dominant nutrient pathway in at least portions of Puget Sound. Quantifying this exchange, as well as understanding the circulation and residence time (described under Models below) in marine areas will decrease the uncertainty in linking human contributions to ecological endpoints. Vertical advection of nutrients from lower layers to upper layers is enhanced at the sills that define the various basins within Puget Sound, including Admiralty Inlet, the Tacoma Narrows, and Hood Canal. In addition, density stratification of the water column by increasing freshwater flows and warming temperatures can reduce vertical advection of nutrients.

Sediment-water interactions, particularly in shallow-water and nearshore environments, can control nutrient dynamics in marine waters. Intense biogeochemical activity within the sediment layers can release nutrients back to the water column and depress near-bottom oxygen levels in both fresh and marine waters. The few measurements that exist exhibit high variability in both time and space.

Natural shellfish populations and aquaculture may influence nutrient cycling at the local level. Filtering may sequester particulate nutrients in shellfish tissues and affect water clarity. Shellfish harvested from marine areas could represent a nutrient sink. Harvesting may enhance sediment releases in the short term.

Eelgrass and other submerged aquatic vegetation take up nutrients from sediments, water column, or both. Eelgrass beds have declined over time in various areas of Puget Sound, which could affect nutrient dynamics locally or seasonally.

Harmful algae blooms can produce toxins that adversely affect human health if ingested. To date harmful algal bloom research in Puget Sound has focused on the climatic conditions associated with blooms. Research from other regions suggests that eutrophication can lead to population shifts that could favor harmful algal blooms. However, few local efforts have considered the link between human nutrient contributions and harmful algae blooms.

In river and stream systems, benthic algae and biofilms exert a stronger influence on dissolved oxygen than phytoplankton, since phytoplankton growth is slow in comparison to riverine travel times. Lake systems often have both phytoplankton and macrophyte (rooted plant) growth that affect nutrients and dissolved oxygen and vary seasonally. Macrophytes take up nutrients from sediments, the water column, or both.

Nutrient concentrations and loads follow seasonal patterns in all major rivers discharging to the Salish Sea. Higher concentrations occur in winter months due to some combination of rainfall, lack of biological uptake, or release of seasonally sequestered nutrients. Summer concentrations vary among rivers and streams and may reflect differences in nutrient attenuation within the watershed and freshwater systems.

Groundwater often contains higher concentrations of nutrients than surface waters do. However, these nutrients can undergo rapid transformation, which attenuates the influence on fresh or marine water quality. Extremely high variability has been noted in the few locations where groundwater attenuation has been evaluated.

Wastewater and stormwater infrastructure may enhance or attenuate the transport and transformation of nutrients. Effluent from centralized wastewater treatment plants typically varies from 10 to 30 mg/L of dissolved inorganic nitrogen and 2 to 5 mg/L of orthophosphate, but concentrations vary from plant to plant based on the technology employed and how the plant operates. Levels also vary seasonally since wastewater treatment largely relies on biological processes. The location of the discharge influences the level of environmental effect.

Effluent from onsite sewage systems typically ranges from 50 to 60 mg/L of DIN, but concentrations also vary depending on the technology used and the strength of wastewater treated. The greatest variability, however, is in the attenuation of these nutrients released to leach fields. Leach fields in saturated, coarse soils provide very little attenuation, while releases to unsaturated, loamy soils can provide high levels of attenuation. Previous efforts have identified landscape characteristics associated with high groundwater nitrogen levels and have estimated nutrient contributions from OSS, but the high variability in subsurface attenuation coupled with intense biogeochemical processing between anoxic and oxic waters leads to very high uncertainty in estimates extrapolated from various studies.

Traditional stormwater infrastructure often focuses on controlling particulates, which would control phosphorus more than nitrogen. More information is needed on BMP performance in controlling the forms of nitrogen and phosphorus, particularly with low impact development technologies.

Supplement Monitoring of Key Processes and Locations

In addition to the component- or process-specific monitoring described above, several innovative monitoring programs may enhance our ability to describe ecosystem components influenced by the complex interplay among physical, chemical, and biological factors related to nutrient dynamics. Recent improvements in sensor technologies offer economical options for continuous measurements to describe highly patchy or highly sporadic ecosystem attributes.

Remote sensing offers measurements over the entire Salish Sea. These snapshots are often limited to surface and near-surface processes and may not be available every day or when clouds interfere. Ferry-based deployments offer transects in key regions but may be limited to surface and near-surface environments. Finally, moorings are being used to increase the frequency of measurements and to produce detailed observations throughout the water column rather than at discrete depths. These have been used in shallow waters as well as deeper marine waters, and also in freshwater environments.

Develop Modeling Tools and Apply to Management Questions

Models inform decision makers about the relative influence of different natural and human factors on ecological endpoints such as dissolved oxygen. These tools always represent simplifications of the remarkably complex environments of the Salish Sea ecosystem. Ecosystem health must be assessed at different spatial and temporal scales, and no one modeling tool can be used to address all management questions.

Models reflect the extent of or limitations of our collective knowledge of the Puget Sound ecosystem. The component or process data gaps described above decrease our ability to forecast how the Puget Sound ecosystem responds to pressures today and to manage its health into the future. Modeling tools provide a framework for leveraging our collective knowledge to forecast the management activities that may have the greatest influence on Puget Sound health. Models can also refine monitoring programs.

Circulation, residence time, and vertical mixing strongly influence dissolved oxygen concentrations and determine the overall sensitivity of portions of Puget Sound to natural and human nutrient inputs. Additional modeling efforts should refine simple box models and should also improve the performance of complex models, focusing on processes most important to nutrient dynamics. Water quality models are needed to forecast large-scale phenomenon decades into the future as well as small-scale processes over short time frames. Ongoing efforts have improved our understanding of Puget Sound circulation

and nutrient dynamics, but further development will be needed in specific regions or at smaller time scales, depending on the outcome of these existing efforts. These modeling tools must be developed in phases, drawing from the collective knowledge gained across many efforts and responding to evolving management questions.

Recent management questions extend beyond the capabilities of tools currently in development. Additional tool development is needed to evaluate areas where existing or future shellfish may influence local or regional nutrient dynamics. In addition, developed lands produce higher nutrients than undeveloped lands. As reductions are identified, tools are needed to optimize where and when to apply BMPs to reduce or otherwise attenuate nutrient impacts to downstream water bodies.

Appendix 5: Effectiveness Monitoring

Monitoring how effective an effort is at restoring or improving ecosystem health is a critical component which can improve the likelihood that activities will be successful. Effectiveness monitoring determines whether programs, strategies, or projects that have been implemented to improve water quality or ecosystem health are working. It tests not only whether the strategy worked, it also determines if the effort is cost-effective and provides information on how can the effort be improved. It is an important tool that can be used in the adaptive management process allowing restoration strategies to be modified if project goals are not being achieved. Ultimately, the goal of effectiveness monitoring is to increase efficiency in making management decisions when planning and implementing best management practices to restore ecosystem health

In general, an effectiveness monitoring program should be able to answer questions at multiple levels. At a higher- or program-level, effectiveness can be evaluated by tracking if projects are resulting in cleaner water. At an individual plan level, effectiveness is determined by tracking trends in water quality in the study area, knowing if established water quality targets or standards are being met, and determining if additional implementation or planning is needed. At the lowest level, effectiveness of individual best management practices can be evaluated.

Any effectiveness monitoring effort needs a plan which identifies specific monitoring goals and objectives and describes the process of how data will be generated and analyzed to answer them. Without proper planning, effectiveness monitoring might not produce the type and quantity of data needed to detect water quality changes. Oftentimes, the need for planning is not apparent until a monitoring project is underway or complete. The steps for developing an effectiveness monitoring plan include:

- Characterization of Study Area
- Site and Parameter Selection
- Indicator Selection
- Study Design Selection

Indicators should be selected based on the goals of the study and how they are expected to respond to restoration efforts. The frequency in which the parameter is collected will depend on the level of confidence needed and what type of monitoring strategy will be used to meet the study goals. Sampling frequency should be calculated using standard statistical measures and will also depend on the type of study design used.

Question	Type of Monitoring
What are current water quality conditions?	Baseline
Overall status of water in the watershed?	Status

Are conditions changing over time?	Trend
Are water quality standards and targets being met?	Compliance
Where BMPs installed and are they being maintained?	Implementation
Are additional source control needed?	Source Identification
Are the original assumptions of the water quality model correct?	Validation
Are changes in water quality link to implementation of pollution control measures?	Effectiveness